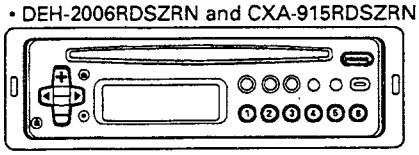
PION-04956

PIONEER
The Art of Entertainment

Service Manual

• DEH-2006RDSZRN and CXA-915RDSZRN



ORDER NO.
CRT1664

HIGH POWER CD PLAYER WITH RDS TUNER

DEH-2006RDSZRN EW
DEH-2006ZRN X1B/EW

COMPACT disc DIGITAL AUDIO

● **These models have been installed in RENAULT ESPACE, CLIO and 19.**

Model	RENAULT Part No.
DEH-2006RDSZRN/EW	7700845459
DEH-2006ZRN/X1B/EW	7700845459

● **See the service manual CX-540(CRT1574) for the CD mechanism description, disassembly and circuit description.**

● **The CD mechanism employed in this model is one of CX-540 series.**

CONTENTS

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K-FFD.JAN. 1995 Printed in Japan

4956

● **CD Player Service Precautions**

1. For pickup unit(CGY1031) handling, please refer to"Disassembly"(CX-540 Service Manual CRT1574). During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

● **Before transporting this product, always perform the following procedure :**

1. Insert the test disc (TCD–784) and play track number 2.
2. Switch the source to "tuner".
3. Eject the test disc.

SAFETY INFORMATION

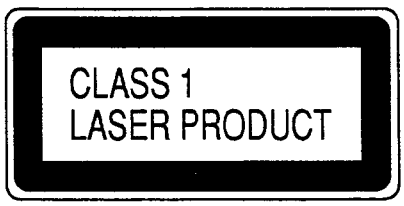
1. Safety Precautions for those who Service this Unit.

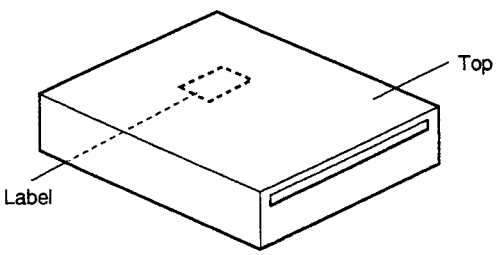
- **Follow the adjustment steps (see pages 14 through 20)in the service manual when servicing this unit. When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.**

Caution:

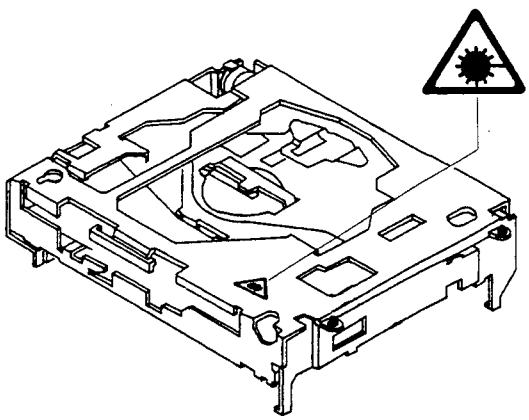
1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.
2. During repair or tests, do not view laser beam for 10 seconds or longer.

2. A "CLASS 1 LASER PRODUCT" label is affixed to the top of the player.





3. The triangular label is attached to the mechanism unit frame.



4. Specifications of Laser Diode

Specifications of laser radiation fields to which human access is possible during service.
Wavelength = 785 nanometers
Radiant power = 69.7 microwatts(Through a circular aperture stop having a diameter of 80 millimeters)
0.55 microwatts(Through a circular aperture stop having a diameter of 7 millimeters)

1. SPECIFICATIONS

General

Power source ..... 14.4 V DC (10.5 — 16 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 9 A
Dimensions
(chassis) ..... 178 (W) × 50 (H) × 150 (D) mm
(front face) ..... 188 (W) × 58 (H) × 20 (D) mm
Weight ..... 1.5 kg

Amplifier

Max. power output ..... 4 × 15 W (DIN45324)
..... 4 × 07 W (DIN45500)
Load impedance ..... 4Ω (4 — 8Ω allowable)
Tone controls (bass) ..... ±10 dB (100 Hz)
(treble) ..... ±10 dB (10 kHz)
Loudness contour ..... +10 dB (100 Hz), +7 dB (10 kHz)
(volume: –30 dB)

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Frequency characteristics ..... 5 — 20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IEC-A network)
Dynamic range ..... 90 dB (1 kHz)
Number of channels ..... 2 (stereo)

FM tuner

Frequency range ..... 87.5 — 108 MHz
Usable sensitivity ..... 11 dBf (1.0μV/75Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity ..... 16 dBf (1.7μV/75Ω, mono)
Signal-to-noise ratio ..... 70 dB (IEC-A network)
Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 30 — 15,000 Hz (±3 dB)
Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)

MW tuner

Frequency range ..... 531 — 1,602 kHz
Usable sensitivity ..... 18μV (25 dB) (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

LW tuner

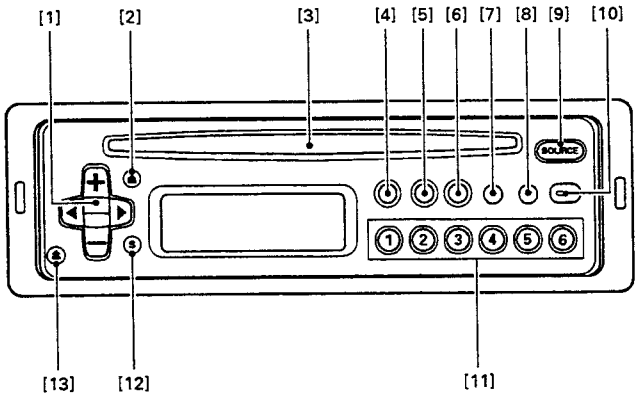
Frequency range ..... 153 — 281 kHz
Usable sensitivity ..... 30μV (30 dB) (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

Note:

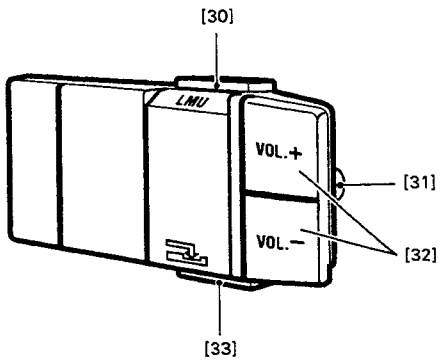
Specifications and the design are subject to possible modification without notice due to improvements.

2. OPERATION

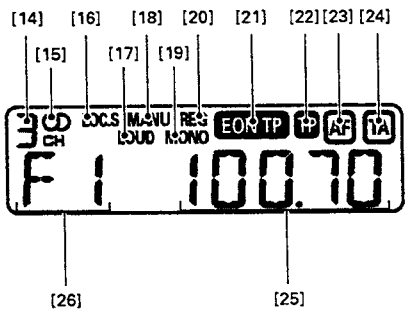
● CXA-915RDSZRN(DETACH GRILLE ASSY)

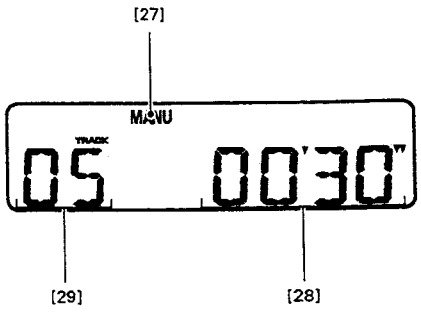


● SATELLITE



● DISPLAY





Changing the Source
(unfold the page 3)

Parts Identification
[9] Source

Changing the Source
Each time the button [9] is pressed, the source will change in the following sequence:
Built-in CD player → AM (MW/LW) → FM → OFF
- If there is no disc in the built-in CD player, the source will not change to "built-in CD player".
- MW and LW are combined in one band.

Adjusting the Audio
(unfold the page 3)

Parts Identification
[1] Volume/Audio adjustment
[12] Shift
[17] Loudness

Volume Adjustment
Pressing the (+) side of button [1] increases the volume, while the (–) side decreases it.
(Display shows "VOL 00" ~ "VOL 30".)
- When driving your vehicle, be sure to keep the volume of the unit set low enough to allow you to hear sounds coming from outside.

Mode Selection
Each press of button [12] changes the mode as follows:
Balance adjustment (FAD/BAL) → Tone adjustment (BAS/TRE) → Loudness adjustment (LOUD)
- When you're adjusting fader, balance, bass or treble, the indicator will stop at the center setting. About 4 seconds after adjustment, the display returns to its previous state.

Balance Adjustment
Press button [12] to select balance adjustment mode. ("FAD" appears on the display.)
Adjust the fader using the (+) or (–) side of button [1]. To adjust the balance, press either the (◄) or (►) side of button [1] to turn on BAL.

Fader
Press the (+) side of button [1] to raise the volume of the front speaker only. Press the (–) side of the button to raise the volume of the rear speaker only.
(Display shows "FAD F9" ~ "FAD R9".)
- Please set "FAD 0" when using 2 speaker system.

Balance
Pressing the (◄) side of button [1] shifts the balance to the left speaker, while the (►) side shifts it to the right speaker.
(Display shows "BAL L9" ~ "BAL R9".)

Tone Adjustment
Press button [12] to select tone adjustment mode. ("BAS" appears.) Select the tone you wish to adjust using the (◄) or (►) side of button [1]. Press (►) to switch BAS → TRE. Press (◄) to switch TRE → BAS.

Bass Adjustment
Select the Bass mode.
Pressing the (+) side of button [1] increases bass, while the (–) side decreases bass.
(Display shows "BAS –6" ~ "BAS +6".)

Treble Adjustment
Select Treble adjustment mode.
Pressing the (+) side of button [1] increases treble, while the (–) side decreases treble.
(Display shows "TRE –6" ~ "TRE +6".)

Loudness Adjustment
This "loudness" function enhances both the high and low ranges of sound to give even more power to output even at low volume.
Press button [12] to select loudness adjustment mode. (The "LOUD" indicator appears on the display.)
Pressing the (►) side of button [1] turns the loudness function on (LOUD [17] light up), pressing the (◄) side turns it off.

Protect your radio from theft
(unfold the page 3)

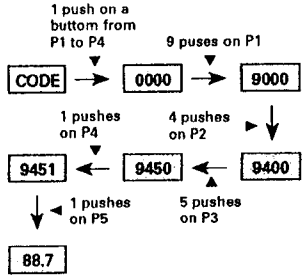
Parts Identification
[11] ① Entering the first digit
② Entering the second digit
③ Entering the third digit
④ Entering the fourth digit
⑤ Entry

Your RENAULT radio will not operate once it is removed from the console, making it virtually useless to a thief. The only way to restore power to the radio once it is removed is to enter a four-digit security code unique to your radio. The anti-theft features of your radio operate as follows:

1. The removal of the battery from the car of the radio will render the radio inoperable until voltage is restored and the security code is entered. The radio must be turned on before the code is entered. The word "CODE" will show on the display.

2. To enter your security code number.

   For Example: You want to enter the code 9451



   Turn the radio on and use the appropriately numbered radio buttons ① to ④ of [11]. After entering a four-digit code number, press button ⑤ of [11] to validate an entry. A wrong input disables you to enter the code number for 1 minute. Like wise, the code number cannot be entered for 2, 4, 8, 16, and 32 minutes.
   You should keep the radio turned on during these waiting time.

3. For the sake of safety, never leave your code number in the car. If you should not know the code number, please contact a RENAULT dealer nearest to you. The dealer will contact RENAULT so as to inform you of your code number.

4. If radio or repair becomes necessary, please give the repair facility your radio code number. If you do not, only authorized RENAULT personnel can obtain the code from RENAULT.

WARNING:
FOR YOUR PROTECTION, CODES WILL **NOT** BE GIVEN OUT TO ANYONE - UNDER ANY CIRCUMSTANCES - EXCEPT AUTHORIZED RENAULT DEALER PERSONNEL AFTER PROOF OF RADIO OR VEHICLE OWNERSHIP AND PROPER IDENTIFICATION IS ESTABLISHED.

Preset Scan Tuning

This recalls in sequence all the stations stored in memory under the buttons [11] for 8 seconds each. Press button [5]. (The [14] number will blink.) To cancel, press the button again. After the desired station is tuned, cancel the preset scan tuning. The station will then continue to be received.

- Stations stored in memory under the buttons [11] but whose signal is weak will not be recalled.

Local Seek Tuning

When the local mode is set, the seek tuning's sensitivity level will become high and only stations with a strong signal will be seek tuned. The local mode's seek sensitivity can be adjusted.

Setting the Local Mode

Press button [4]. (The "LOC.S" [16] will light.) To cancel the local mode, press the button again.

Adjusting the Local Seek Sensitivity

There are 4 local seek sensitivity steps for FM and 2 steps for MW/LW.

- LOC-4 is the highest seek tuning sensitivity level. Only the stations with a strong signal are tuned. LOC-3, LOC-2, and LOC-1 in descending order enables the tuning of stations with a respectively weaker signal.

1. Set to local seek sensitivity adjustment mode. Press button [4] for at least 2 seconds. (The current sensitivity level "LOC-2" will be displayed.)
   - The local seek sensitivity adjustment mode will be canceled after about 5 seconds.
2. Adjust the sensitivity level by pressing (◄) or (►) of button [1].

FM Monaural Reception

If a stereo broadcast has a lot of noise, switching to the monaural reception mode will reduce the noise. Press button [6]. ("MONO" [19] will appear on the display.) To cancel, press the button again.

Using the RDS Function

What is RDS?

RDS (Radio Data System) according to a CENELEC EN50067 is a system for transmitting data signals from FM broadcast transmitter along with the normal sound program. These data signals, which are imperceptable to listeners, are intended to aid radio listeners in tuning their receivers to a desired station. RDS receivers can decode these data signals for display or control purposes. RDS digital signal includes various data, such as PI, PS, AF, TP, TA and EON.

PI.....Program Identification Code
PS .....Program Service Name
AF .....List of Alternative Frequencies
TP.....Traffic Program Identification Code (Similar to SK signal of ARI system)
TA .....Traffic Announcement Code (Similar to DK signal of ARI system)
EON .....Enhanced Other Network Information Code.(In some countries. EON is not offered by broadcasters.)

RDS Function of this Unit

This unit has the following functions for making use of RDS data.

- PS, the name of the currently listened station is displayed.
- AF (Alternative Frequency) function. This enables the receiver to automatically retune to more suitable frequencies transmitting the same program.
- TP/TA, EON, user selectable reception of the traffic information service, offered by RDS.

Network/Station Name Display

Switch the tuner on and choose one of the three FM bands.

When you tune into an RDS station with manual or seek tuning, the frequency display changes to the network/station name display after a few seconds by means of the PS code.

- The RDS functions of this unit use RDS codes transmitted along with FM broadcasts. RDS doesn't work on the MW or LW bands.
- The RDS functions may not work properly in areas where the RDS transmissions are at an experimental stage or where there are flaws in the broadcasting system.
- Press button [6] for two seconds or more to switch to frequency display. The frequency will only be indicated when the button is pressed.

Using the Tuner

(unfold the page 3)

Parts Identification

[1] Tuning
Seek/Manual
Local Seek Sensitivity
[4] Local mode
[5] BSM/Preset Scan
[6] FM Monaural
[7] AF/REG
[8] TA/EON
[9] Source
[10] Band
[11] Preset
[14] Preset Number
[15] FM Stereo
[16] Local mode
[18] Manual
[19] FM Monaural
[20] REG
[21] EON
[22] TP
[23] AF
[24] TA
[25] Frequency
[26] Band

Electronic Tuner

Frequency allocation differs depending upon the area. This unit has been designed in accordance with the frequency allocations for Western Europe, Asia, the Middle and Near East, Africa, Australia and Oceania. Use in other areas may result in improer reception of AM. The RDS function does not work in regions with no RDS broadcast services.

Listening to the Radio

1. Select MW/LW or FM band by pressing source button [9].
   - For details, refer to "Changing the Source" on page 4.
2. FM consists of 3 bands. Select the band by pressing button [10]. Each time the button is pressed, the band will change in the following sequence:
   FM1 → FM2 → FM3
3. Use seek tuning or manual tuning to tune to a radio station.

3-1. Set the tuning mode to "seek" or "manual" by pressing the (◄) and (►) sides of button [1] simultaneously. Repeat this operation to switch to the other tuning mode. (When the manual tuning mode is set, "MANU" [18] will be displayed.)

3-2. Tune by Press (◄) or (►) of button [1]. (When there is a stereo broadcast, "◯" [15] will be displayed.)

Seek Tuning:
When the button is pressed, stations whose signal strength is above a certain level will be tuned automatically.

Manual Tuning:
When the button is pressed, the frequency will change by one step up or down.

Using the Preset Memory

The radio stations can be stored in memory under buttons 1 to 6 of [11].

1. Tune in to the station to be stored in memory.
2. Store the station in memory by pressing one of the buttons (1 to 6) for at least 2 seconds. When the [14] number stops blinking, the station will be stored in memory under the button pressed.
   - Up to 18 FM stations and 6 MW/LW stations can be stored in memory.

Preset Tuning

The radio stations stored in memory can be recalled by pressing the respective button 1 to 6 of [11]. The station stored under that button will be recalled. (The number of the button pressed will be displayed at [14].)

Using the Best Stations Memory (BSM)

The radio stations having a strong signal can be tuned automatically and stored in memory under buttons 1 to 6 [11]. Press button [5] for at least 2 seconds. (The "BSM" will blink.) After "BSM" stops blinking, the stations will be stored in memory under buttons 1 to 6 of [11].

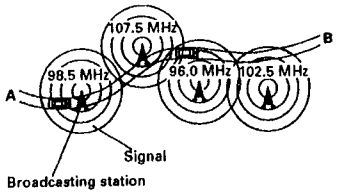
- BSM can be canceled mid-operation by pressing button [5].
- The stations will be stored under buttons 1 to 6 in the order of their signal strength. The strongest station will be stored under button 1, followed by stations with lower signal strengths.
- If there are fewer than 6 stations whose signal is strong, there will be spare memory.
- It will take almost 30 seconds for BSM to be completed.

AF Function

This receiver retunes automatically to a more suitable transmitter, contained in the list of Alternative Frequencies (AF), to enable the motorist to keep listening to programs in the same network.

Example:

If a motorist travels as shown below, from point A to point B, (and has selected AF function) then the receiver will automatically retune to a more suitable frequency transmitting the same program. This is shown by the automatic retuning from 98.5 MHz to 107.5 MHz to 96.0 MHz to 102.5 MHz.



To activate the Alternative Frequency Function, hold down button [7], **"AF"** [23] will appear on the display. Once tuned to a RDS station, as long as you drive within an area served by the same network, the receiver will automatically retune to a more suitable station transmitting the same program, by utilizing the data in the AF list.

- **"PI SEEK"** will appear on the display, if the AF function has been selected, and a suitable AF station cannot be found. In this case, the receiver will mute the radio sound and search the frequency band, in order to find a station with the same PI code. The receiver will return to the original frequency if the same or related PI code can not be found.
- **The AF function will not work in the following cases:**
  - **— when the receiver is tuned to a non-RDS station. (local station)**
  - **— when the RDS station does not transmit any AF list data.**
  - **— when the receiver can not receive the AF list due to disturbances.**

  When the receiver is unable to find a PI code the "AF" [23] indicator will flash on the display.
  Thus indicating that the AF function cannot be performed.

Preset recall

- When recalling preset stations in the AF mode, the tuner will be tuned to the stored frequency and the AF function will be operative i.e. when the signal of the recalled station is weak or has a different PI, the radio will look into the AF list and if necessary start a PI-seek in order to find a station with the same or related PI code.
  When the tuner is performing a PI seek **"PI SEEK"** is shown on the display.
  If the PI seek is successful, the tuner will be tuned to the new frequency that transmits the same programme service (i.e. with the same PI code) and the display will show the stored PS.
  If the PI seek is not successful, the tuner will return to the stored frequency. If a new station (with a different PI code) would be received on this frequency, this station will become audible. The display will show the frequency instead of PS.
- When recalling preset stations in the AF=OFF mode, the tuner will be tuned to the stored frequency and the display will show the stored PS. In case the tuned station has a PI code that is different from the stored one, the tuner will accept the new PI code and stay tuned to the initial frequency. The display will show the new PS when the signal of the tuned station is strong enough.

Listening to Regional Stations

In some countries a particular programme service may "opt out" during a certain part of the day in several regional variants at particular locations. Since these regional variants are broadcasting a different programme they temporally have a PI and a PS that is different from the main programme service.
The PI's are mostly "generically linked". The AF list may either be common for all regional variants or each regional variant may have its own AF list.
In other countries there may be regional stations which are not an "opt out" of a particular main programme service but which have an independent existence. These regional stations all have a different PS. Their PI's may be "generically linked" and their AF lists may carry frequencies which are alternatives for that regional station only.

1) Regional OFF Mode

In the default condition, with the AF button [7] switched ON, the receiver is in the REG OFF mode. In this case the receiver will switch automatically to regional variants of the tuned programme service along the journey. This is of benefit when the regional variants just carry the same programme, but will become annoying if the receiver switches back and forth between different programmes. In this case it is recommended to put the receiver in the REG ON mode.

2) Regional ON Mode

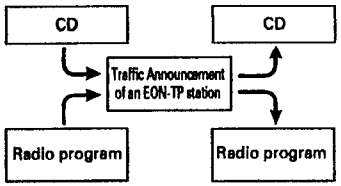
When the radio is put in the REG ON mode, the radio will remain tuned to a specific regional variant as long as it is available.
Press button [7] for two seconds or more to put the radio in the REG ON mode. **"REG"** [20] will appear on the display.
Press down button [7] for two seconds or more to cancel the REG ON mode, i.e. to put the radio back in the default REG OFF mode. **"REG"** [20] will disappear from the display.

Traffic Information Reception

TP and EON-TP function

When a traffic information station (TP station) is selected, **"TP"** [22] lights on the display, thus indicating traffic report can be received through this station. The **"EON TP"** [21] indicator will light on the display when a selected station (this network) is broadcasting EON information which cross-references at least one program service which carries traffic information, thus indicating traffic report can be received through another program service by using the EON function of this unit.
In both cases, by briefly pressing button TA [8], Traffic report waiting status will be entered. However, if you wish not to interrupt your radio program (eg: classical music program) by traffic report, the EON function of this unit can be set to OFF. Pressing button [8] for more than 2 seconds, changes the status of the EON function, EON ON ⇄ EON OFF.
This indication is shown on the display for approximately 3 seconds.
If only the **"EON TP"** [21] indicator is on but the EON function of this unit is OFF, it is not possible to receive traffic report through another program service. In this case, **"TA"** [24] (if traffic report waiting status is set to ON) will flash on the display to indicate this situation.

Traffic information reception by EON-TP



Traffic Announcement Volume Adjustment

- The volume level for traffic information broadcasting is temporarily stored in memory. The next time you listen to traffic information, the previous volume level is used. If the volume level you receive is lower than the previous setting, the volume is no reduced, but set to VOL 15.

TA Reception during CD play

- If the radio is already set to the FM band and tuned to a TP or EON-TP station, even when listening to the CD player, when the button [8] is pushed (**"TA"** [24] is shown or the display), traffic report waiting will begin. When a traffic report begins, the system will switch from CD to the traffic report.

BSA function

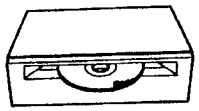
- While button [8] is on, (**"TA"** [24] is shown on the display) and AF is off, and you are listening to CD player, should the TP station become weak, the radio will start BSA (Best TP Station Auto Search) 10 seconds after **"TP"** [22] disappears from the display The tuner will automatically tune to the strongest TP station in the area, and will stand by for a traffic bulletin. BSA does not work when the AF function is selected, press button [7] to turn the AF function off.

TP Alarm Function

- In AF mode, about 30 seconds after **"TP"** [22] disappears from the display, which occurs if the signal from the TP station becomes weak, an alarm sounds for 10 seconds to tell you to tune to another TP stations.

Listening to the CD Player

1. With the label side up, insert a disc into [3]. Playback will start. (The track number [29] and playback time [28] will be displayed.)
   - *Do not insert the disc with the label side down. Doing so may scratch the disc.*
   - If the disc stops midway while it is being inserted or if there is no playback after a disc is inserted, something may be wrong with the disc. Eject the disc and check it.
2. Turn ON/OFF the disc playback. Press button [9] to change the source.
   - For details, refer to "Changing the Source" on page 4.
3. Eject the disc by pressing button [2].
   - *For 12cm CD, in the disc is not removed within 10 seconds after ejection, it will be inserted again.*
   - *For 8cm CD, do not leave the disc halfway into the unit as shown below. Doing so may cause the disc to be bent or dropped.*



Auto Stop

When playback of the final track ends during normal play, the unit switches back to the original source.

Using Track Number Search, Fast Forward and Reverse

1. Set the mode to "track number search " or "fast forward and reverse".
   Press the (◄) and (►) sides of button [1] simultaneously. Each time this is repeated, the mode will switch between the track number search mode and fast forward and reverse mode. (When the fast forward and reverse mode is set, "MANU" [27] will light.)
2. Execute a track number search or fast forward and reverse by pressing (◄) and (►) of button [1].
   - Playback sound can be heard during fast forward and reverse.

Pausing

The disc playback can be stopped temporarily by pressing ① of button [11]. (The "PAUSE" will be displayed.) To cancel the pause, press the button again.

Repeat

1. To repeat the music you are listening to, press button ② of [11] ("RPT" will appear on the display).
2. To cancel music repeat, press button ② of [11] to turn off "RPT".

Random Play

1. To play music randomly, press button ③ of [11] ("RDM" will appear on the display). Once the current track has been played, the microprocessor will randomly select the next and subsequent tracks.
2. To cancel random play, press button ③ of [11] to turn off "RDM".
   - *Since selections are played in random order, the same selection may be played twice in succession.*

Error Display

If there is a problem with CD playback, an error code will be displayed.
(Ex.: "ERROR-10")
If an error is displayed, refer to the table below to identify the problem. If the error is displayed even after corrective action is taken, contact your dealer or the nearest authorized PIONEER Service Station.

D: Display
C: Cause
T: Treatment

D: ERROR-11, 12, 14, 17, 30
C: The disc is dirty.
T: Clean the disc.

D: ERROR-11, 12, 17, 30
C: The disc is scratched.
T: Replace the disc.

D: ERROR-11, 14, 17
C: The disc is inserted with the label side down.
T: Insert the disc with the label side up.

D: ERROR-14
C: An unrecorded CD-R is being used.
T: Check the disc.

D: ERROR-10, 11, 12, 14, 17, 30, A0
C: Electrical or mechanical fault.
T: Turn off the car's ignition and turn it back on again. Or change the source to another one and then change it back to CD.

D: HEAT
C: The CD player's internal temperature is high.
T: Wait until the CD player's internal temperature goes down.

Tuning Functions on each RDS modes

Tuning Mode	AF Mode	TA Mode & AF plus TA Mode
Seek Tuning will stop to find,	RDS Stations	TP or EON-TP Station
BSM will select and memorize in presets,	RDS Stations	TP Stations

Non-RDS station such as those using the Swedish MBS system may be tuned in as RDS station, but this is due to both systems using the same 57 kHz subcarrier frequency and is not a mulfunction of the unit.

Tuning Steps

The tuning step is normally 50 kHz during seek tuning on an FM band. However this tuning step changes to 100 kHz when the set is in AF or TP mode. In some countries it may be desired to set a tuning step of 50 kHz in AF mode by holding down the ① of button [11] while turning the ignition key from OFF to ON.

- During manual tuning, the step does not change; it remains fixed at 50 kHz.
- The tuning step will return to 100 kHz if the batteries supply is temporarily disconnected.
- In AF mode, only those stations being broadcast at 100 kHz steps are subject to AF reception (CENELEC STANDARD).

Playing Compact Discs

(unfold the page 3)

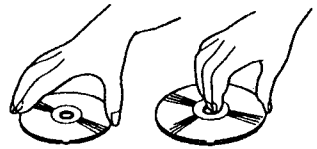
Parts Identification

[1] Track Number Search
    Fast Forward and Reverse
[2] Eject
[3] Disc Insertion Slot
[9] Source
[11] ① Pause
     ② Repeat
     ③ Random play
[27] Manual
[28] Playback time
[29] Track number

Discs

- *Only use compact discs (optical digital audio discs) bearing the mark shown below.*

- *Do not use cracked, scratched, or warped discs.*
- *Do not touch the disc's playing side. Handle the disc as shown below.*



- *Do not affix any label on the disc.*
- *Do not apply any vinyl record spray, antistatic agent, benzene, paint thinner, or any other volatile chemicals.*
- *Do not play a dirty disc. Use a soft cloth to clean a dirty disc as shown below. Wipe the disc outward from the center.*

- *Do not place the disc in high temperatures and direct sunlight.*
- *Be sure to store the disc in its case.*

CD Playing Environment

- Disc playback may be interrupted by sudden road shock.
- When the air temperature is low and the car heater is turned on, condensation on the disc and internal parts of the unit may prevent proper playback operation. If this happens, turn off the unit and wait one hour until the condensation is gone. Also, use a soft cloth to wipe off any condensation from the disc.

Using the satellite (remote control unit)

(Unfold the page 3)

Adjusting the Audio

[32] Volume/Attenuator

Volume

Pull the (+) side to raise the volume. Pull the (–) side to lower the volume.

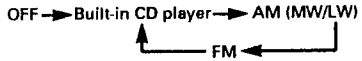
Attenuator

Simultaneously pulling the positive (+) and negative (–) sides of the button [32] decreases the sound volume immediately by 20 dB. Pulling either of them again will resume the sound volume.

Changing the Source

[30] Changing the Source

Press the button for two seconds or more to switch the source OFF as follows.



Using the Radio

[30] Switching the source

Press the key for 2 seconds or more to switch the source as follows:

[31] Preset stations

It is possible to recall broadcasting stations stored in the memory of the preset button. Switch the channel using the dial.

[33] Seek Tuning/BSM

Seek Tuning

When the button is pressed, stations whose signal strength is above certain level will be tuned automatically.

Best Stations Memory (BSM)

Press the button for two seconds or more to activate the BSM function.

Using the CD Player

[31] Track Number Search

Turn the dial to search for the desired track (track number) in the disc currently being played.

[33] Pausing

1. Press this button to pause during disc playback.
2. Press the button again to release the pause.

Illumination

Illumination of this unit can be reduced by turning ON the light switch.

3. DISASSEMBLY

● Removing the Case

1.Remove the three screws.
2.Insert and turn a flat screwdriver at locations indicated by arrows to remove the case.

● Removing the Detach Grille Assy

1.Press the detach button, and then pull detach grille Assy.

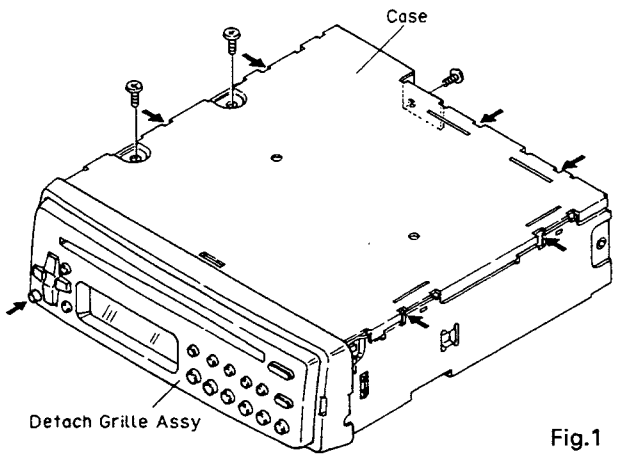


Fig.1

● Removing the Panel Assy

1.Remove the screw B and disconnect the two stoppers indicated by arrows.
2.Disconnect the connector, and then remove the panel assy.

● Removing the CD Mechanism Module

1.Remove the four screws A.
2.Disconnect the connector.
3.Remove the CD Mechanism Module.

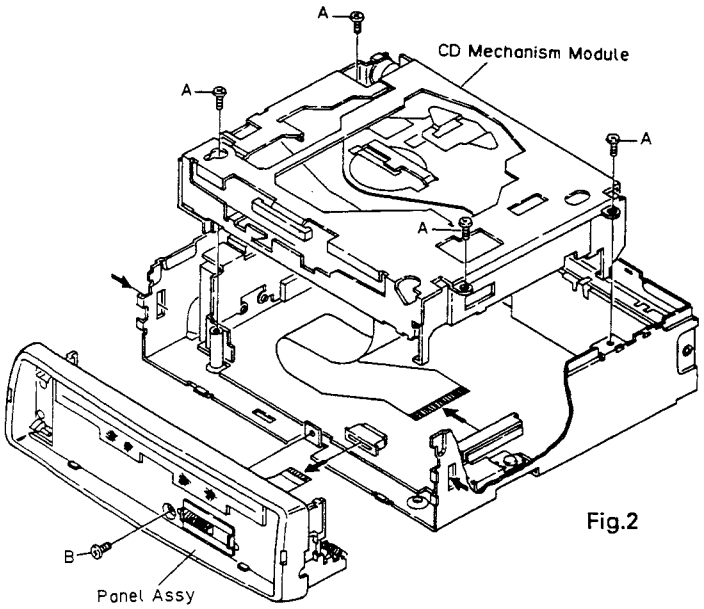


Fig.2

● Removing the Chassis Unit

1.Remove the two screws C and two screws D.
2.Remove the screw E.
3.Stretch the claw.
4.Remove the chassis Unit.

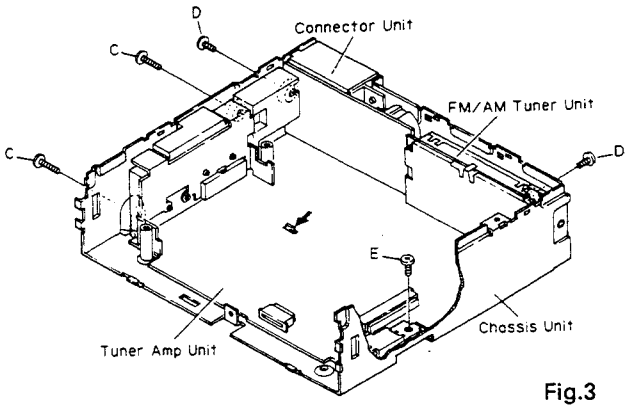
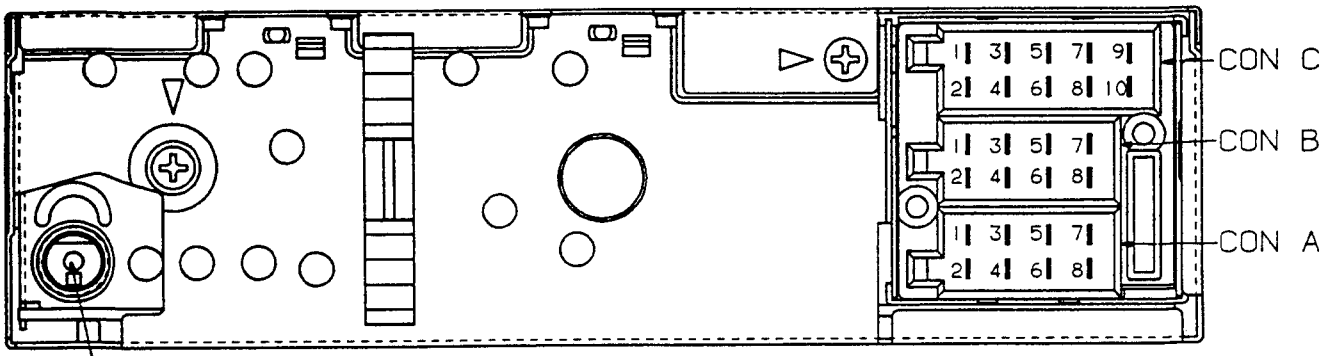


Fig.3

4. CONNECTOR FUNCTION DESCRIPTION



	CON A	CON B	CON C
1		RR1	
2	ILL	RR2	
3	TEL MUTE	FR1	
4	BACK UP	FR2	GND
5	ANT PW	FL1	LO
6		FL2	IN2
7	ACC	RL1	L1
8	GND	RL2	IN0
9			L5
10			IN1

Fig.4

5. ADJUSTMENT

5.1 CD PLAYER SECTION

1)Precautions

· This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND.
If REFO and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.
Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
If by accident REFO comes in contact with GND, immediately switch the regulator or power OFF.

· Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

· Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

· Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

· Test mode starting procedure
Switch ACC, back-up ON while pressing the **4** and **6** keys together.

· Test mode cancellation
Switch ACC, back-up OFF.

· Disc detection during loading and eject operations is performed by means of a photo transistor in this unit. Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
*During PLAY, even if the eject button is pressed,the disc will not be ejected and the unit will remain in the PLAY mode.
*The unit will not load a disc.
When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

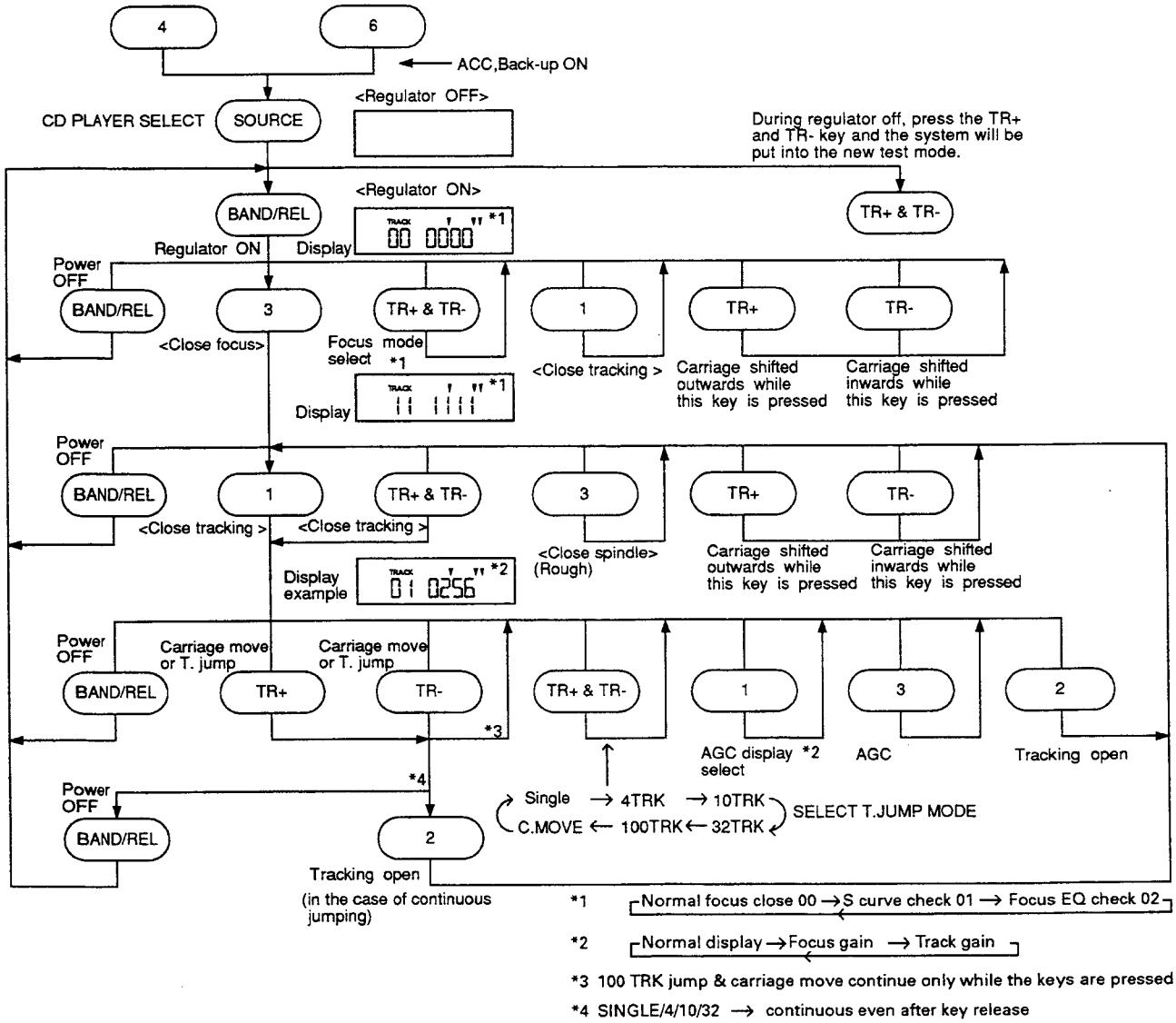
· When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing another key. Otherwise, there is a risk of the actuator being destroyed.

· Turn power off when pressing the button **TR+** or the button **TR-** key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)

· SINGLE/4TRK/10TRK/32TRK will continue to operate even after the key is released. Tracking is closed the moment C-MOVE is released.

· JUMP MODE resets to SINGLE as soon as power is switched off.

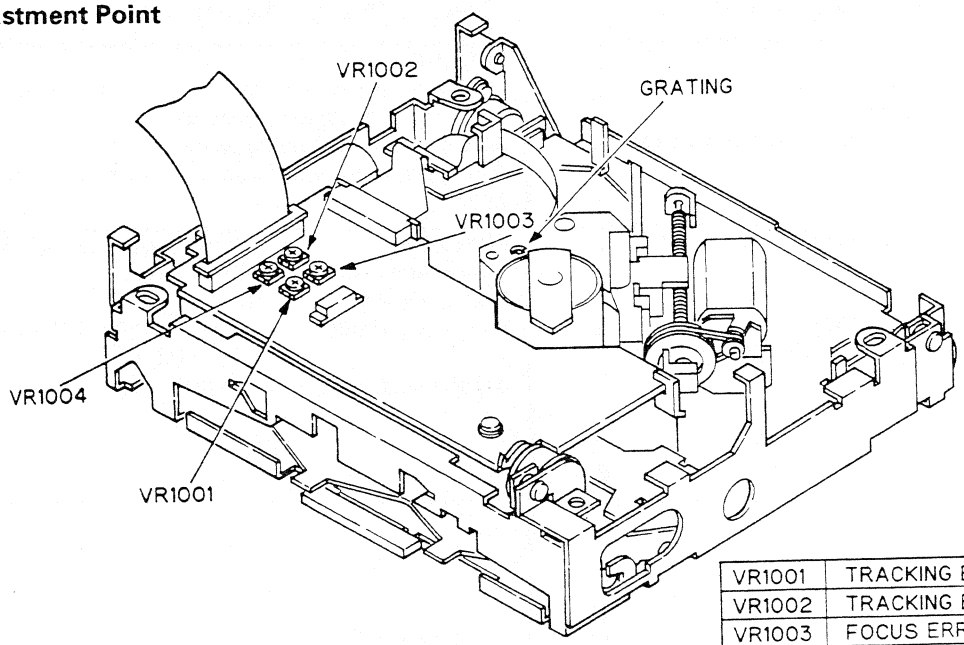
● Flow Chart



● Measuring Equipment and Jigs

Adjustment	Measuring equipment & jigs
1 Tracking Error Offset Adjustment 1	DC V Meter
2 Grating Check / Adjustment 1	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4), Two L.P.F., Clock Driver
3 Grating Adjustment 2	Oscilloscope, Grating Adjustment Filter (B.P.F.), mV Meter, ABEX TCD-784 (or SONY TYPE 4), Two L.P.F., Clock Driver
4 Tracking Balance Adjustment 1	Oscilloscope, Low-pass Filter, ABEX TCD-784 (or SONY TYPE 4)
5 Focus Bias Adjustment	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4)
6 RFO Offset Adjustment	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4)
7 Tracking Error Offset Adjustment 2	DC V Meter
8 Tracking Balance Adjustment 2	Oscilloscope, Low-pass Filter, ABEX TCD-784 (or SONY TYPE 4)

Adjustment Point



VR1001	TRACKING ERROR OFFSET
VR1002	TRACKING BALANCE
VR1003	FOCUS ERROR BIAS
VR1004	RFO OFFSET

Fig.5

Test Point

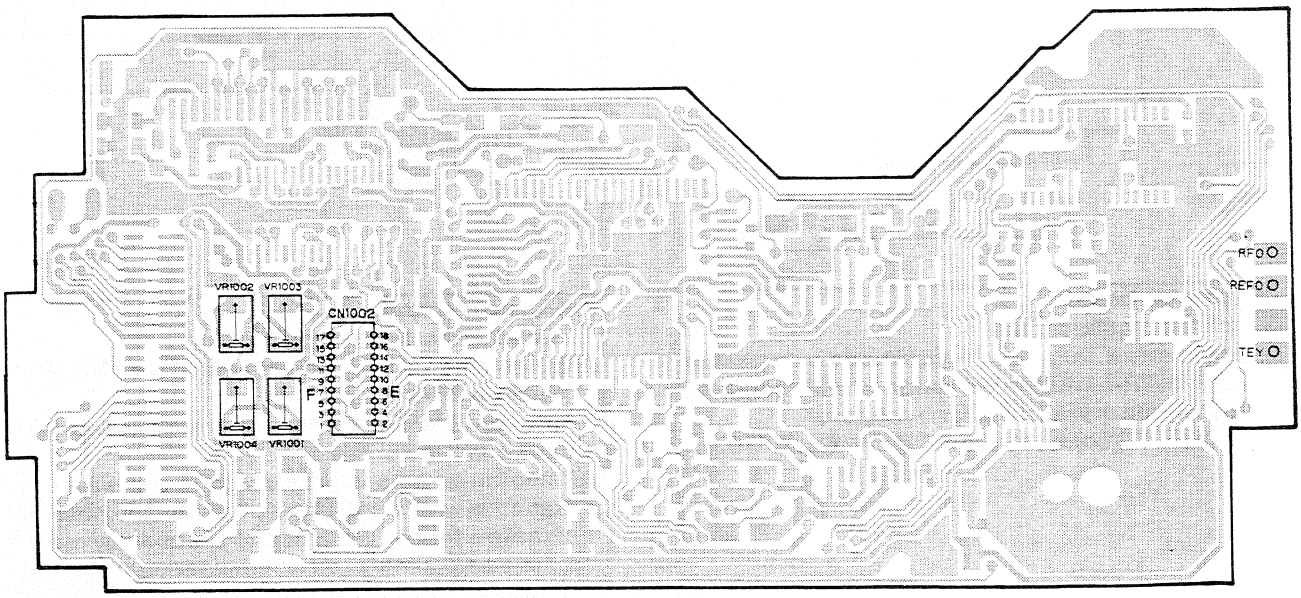
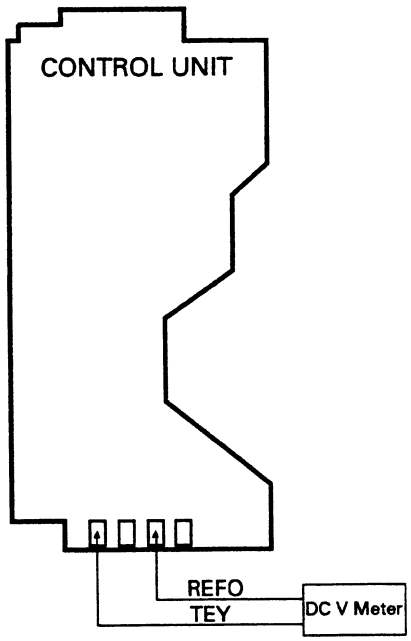


Fig.6

1 Tracking Error Offset Adjustment 1

·**Purpose :**
To adjust the offset of the tracking pre-amp to zero.
·**Symptoms of Mal-adjustment :**
Track search NG, carriage runaway, poor playability.

·**Measuring Equipment / Jig**	·DC V Meter
·**Measuring Point**	·TEY
·**Test Disc , Mode**	·TEST MODE
·**Adjustment Point**	·VR1001(TE OFFSET VR)

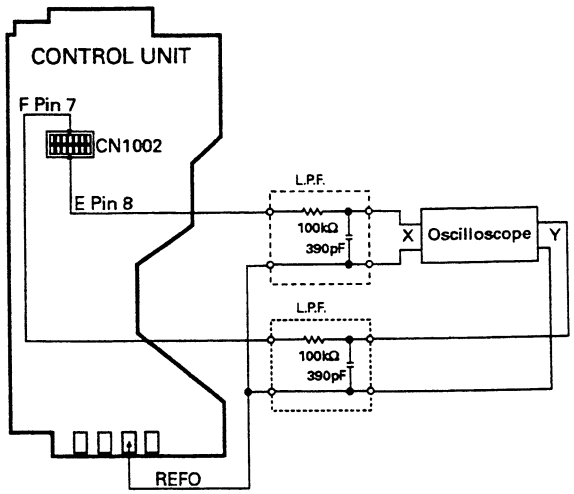


Adjustment Procedure
1.Switch the regulator on.
Select Focus EQ check in Focus mode by pressing key **TR+** & **TR-**. And the indication 00 will change to 02. This mode makes the laser turned off.
2.Using VR1001, adjust TEY to 0 ± 25mV w.r.t. REFO.

2 Grating Check / Adjustment 1

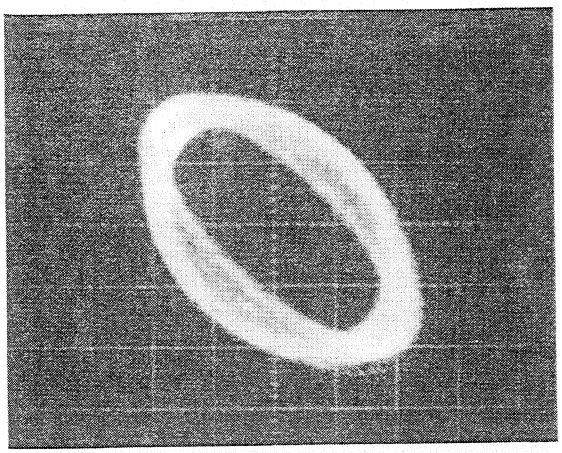
·**Purpose :**
To check that the PU grating is correctly aligned after the PU unit has been replaced.
·**Symptoms of Mal-adjustment :**
Unable to play disc, track skip during search, search NG.

·**Measuring Equipment / Jig**	·Oscilloscope, Two L.P.F., Clock Driver
·**Measuring Point**	·E, F
·**Test Disc , Mode**	·ABEX TCD-784 (or SONY TYPE 4), TEST MODE
·**Adjustment Point**	·Grating hole



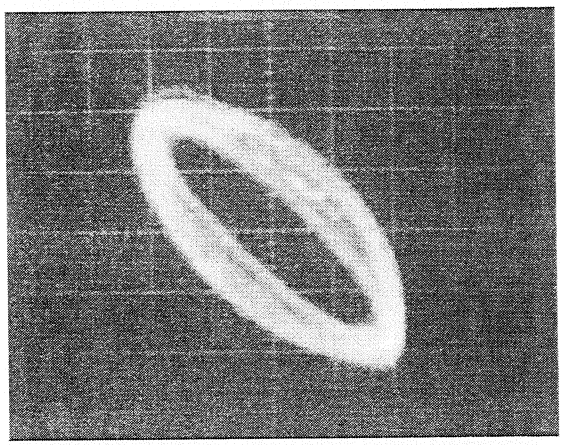
Adjustment Procedure
1.Load disc and switch regulator on.
2.Position the PU unit in the center of the disc using the **TR+** & **TR-** keys.
3.Press key **3** to close focus and press once more to close spindle.
4.Referring to the photographs given check that the grating is within ±45°. If not, it should be possible to make a fine adjustment to the grating by slowly tuning the grating screw. If, however during the adjustment the lissajous figure is seen to "FLIP" then the null point must be found and the adjustment made from there(see next section).

Lissajous figure (AC input)
Horizontal axis E 10mV/div.
Vertical axis F 10mV/div.



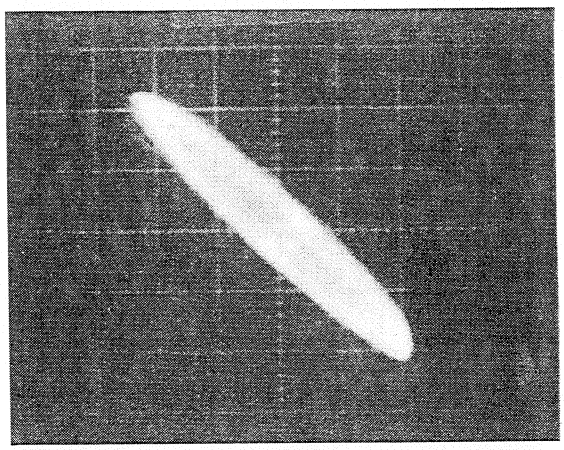
60°=NG

Waveform 1



45°=OK
(Limit)

Waveform 2



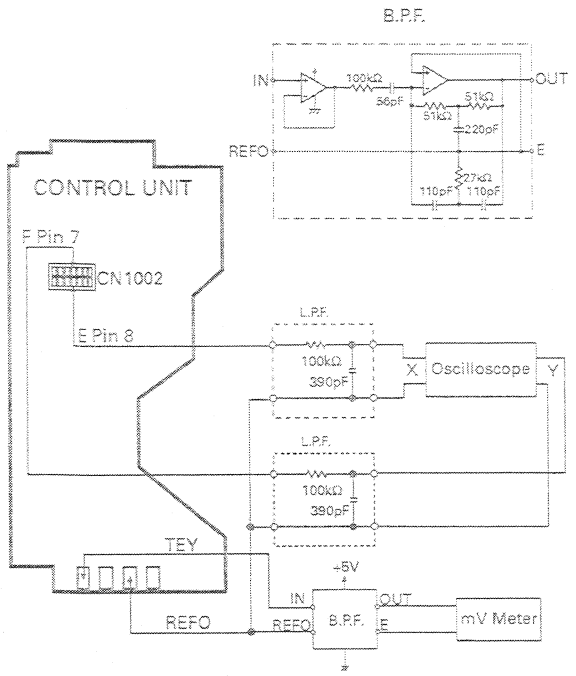
0°=BEST
(Doesn't become a single line due to eccentricity)

Waveform 3

3 Grating Adjustment 2

·**Purpose :**
This needs to be done if the previous adjustment was unsuccessful.
·**Symptoms of Mal-adjustment :**
Unable to play disc, track skipping, track search NG.

·**Measuring Equipment / Jig**	·Oscilloscope, Grating Adjustment filter (B.P.F.), mV Meter, Two L.P.F., Clock Driver
·**Measuring Point**	·TEY, E, F
·**Test Disc , Mode**	·ABEX TCD-784 (or SONY TYPE 4), TEST MODE
·**Adjustment Point**	·Grating hole

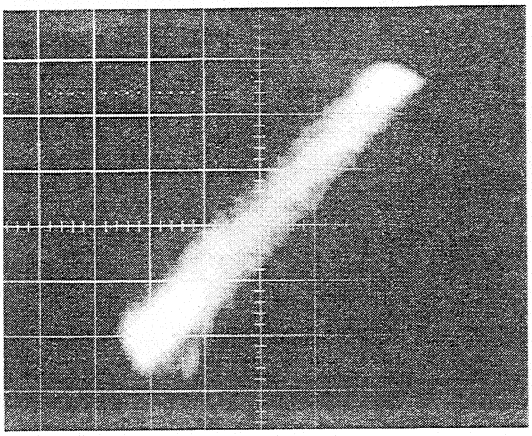


Adjustment Procedure

1. Load disc and switch regulator on.
2. Position the PU unit in the center of the disc using the **TR+** & **TR-** keys.
3. Press key **3** to close focus and press once more to close spindle.
4. While monitoring the output of the B.P.F. connected to TEY, slowly turn the grating screw. The output voltage should pass through many minimums; search for the minimum which is clearly smaller than the rest - this is the "null point", where the E & F sub-beams are lined up with the tracks on the disc.
5. From this null point, turn the grating screw clockwise (as seen from the underside of the PU unit) until the lissajous waveform is a single line (or close as possible) as shown in the photograph.

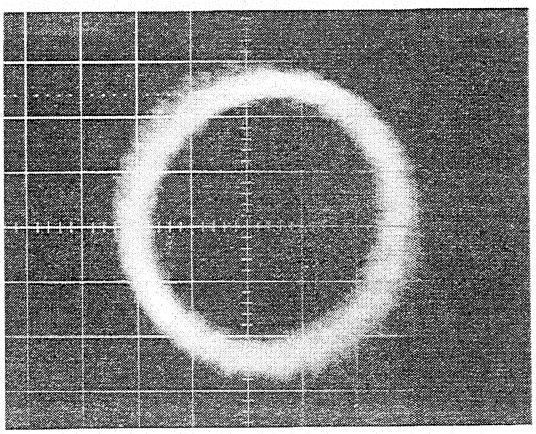
Lissajous figure (AC input)
Horizontal axis E 10mV/div.
Vertical axis F 10mV/div.

Null Point=180°



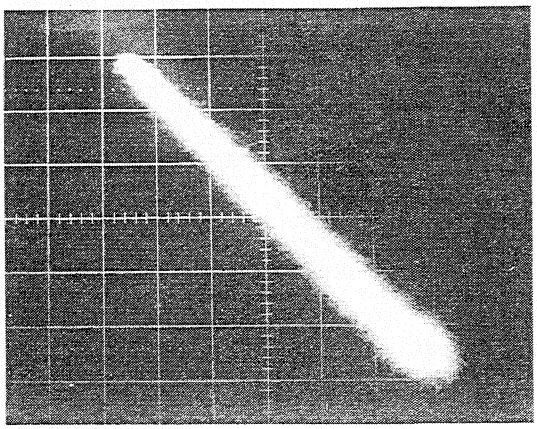
Waveform 4

"Rough" adjustment=90°



Waveform 5

Final adjustment=0°

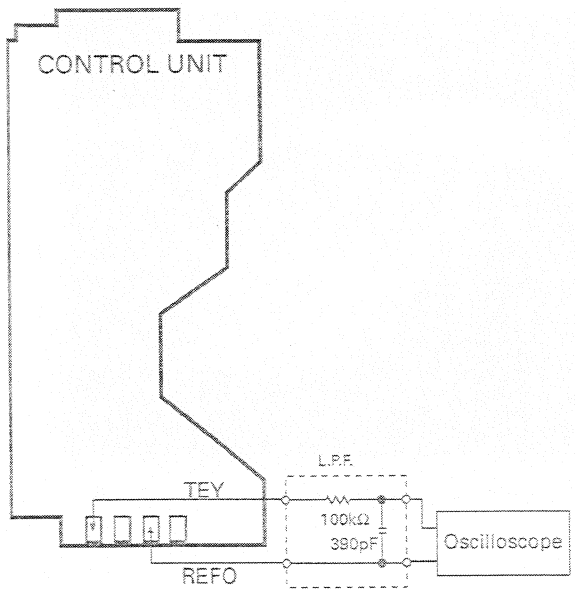


Waveform 6

4 Tracking Balance Adjustment 1

- **Purpose :**
  To equate the sensitivity of the F channel to that of the E channel.
- **Symptoms of Mal-adjustment :**
  Track search NG, poor playability carriage runaway.

· Measuring Equipment / Jig	· Oscilloscope, L.P.F.
· Measuring Point	· TEY
· Test Disc , Mode	· ABEX TCD-784 (or SONY TYPE 4), TEST MODE
· Adjustment Point	· VR1002 (T.BAL VR)



Adjustment Procedure

1. Load disc and switch the regulator on.
2. Position the PU unit in the center of the disc using the **TR+** & **TR-** keys.
3. Close focus by pressing key **3**.
4. Observing the TEY waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (see waveform 7–9).

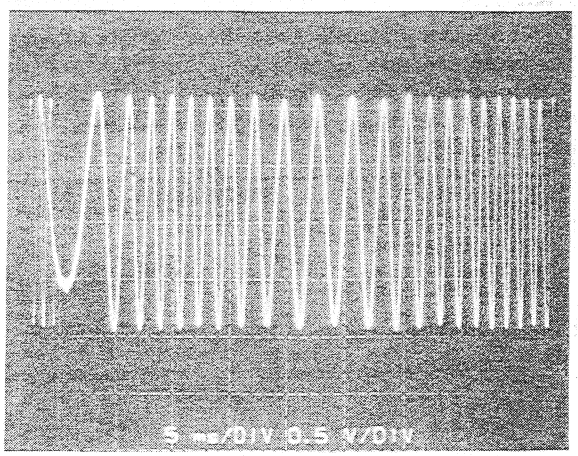
Check

After adjustment the TEY waveform should have an amplitude of 1.5±0.65 Vpp.
(ABEX TCD-784 or SONY TYPE 4)
(Providing focus bias is OK)

DC Mode
0.5V/div.
5ms/div.

+5% NG

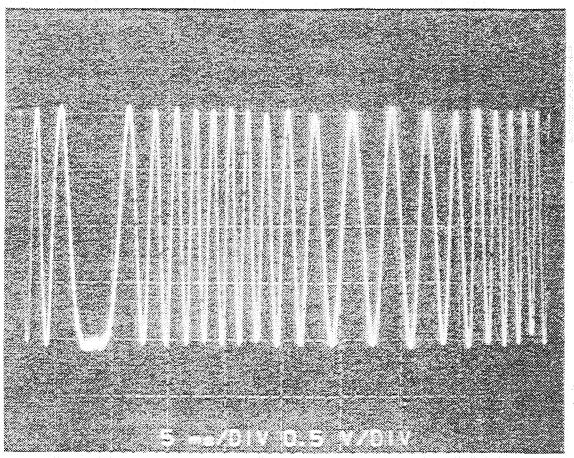
REFO →



Waveform 7

±0% OK

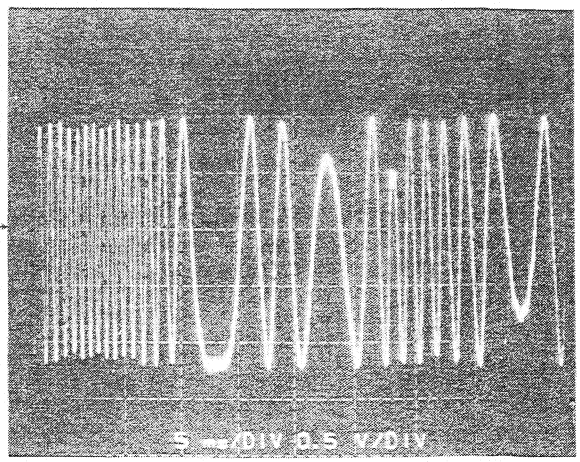
REFO →



Waveform 8

-5% NG

REFO →

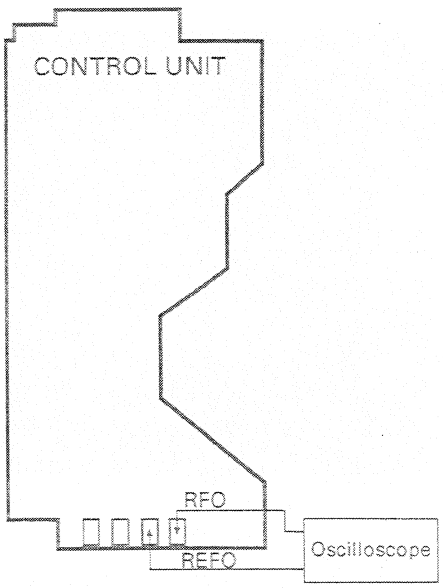


Waveform 9

5 Focus Bias Adjustment

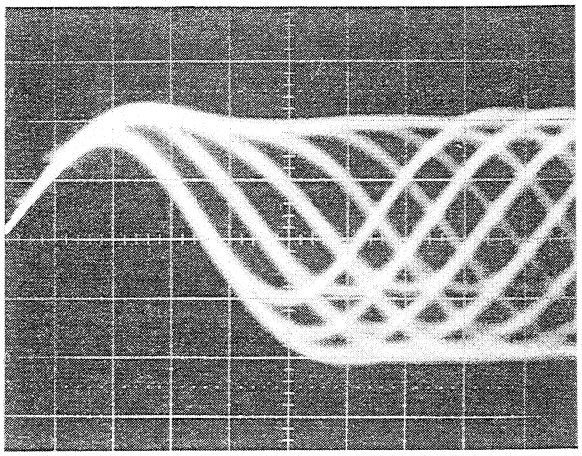
· **Purpose :**
To adjust the focus servo reference so that the RF waveform is an optimum.
· **Symptoms of Mal-adjustment :**
Difficulty in closing focus, poor playability.

· **Measuring Equipment / Jig**	· Oscilloscope
· **Measuring Point**	· RFO
· **Test Disc , Mode**	· ABEX TCD-784 (or SONY TYPE 4), NORMAL MODE
· **Adjustment Point**	· VR1003 (FE BIAS VR)



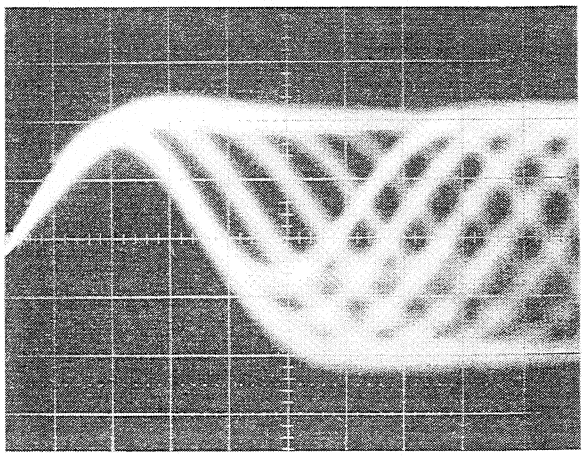
Adjustment Procedure
1. Play track number 18.
2. Adjust VR1003 so that the RFO waveform amplitude is a maximum and eye pattern is optimum.

Check
After adjustment the RFO waveform should have an amplitude of 1.7±0.65 Vpp.
(ABEX TCD-784 or SONY TYPE 4)



OK

Waveform 10



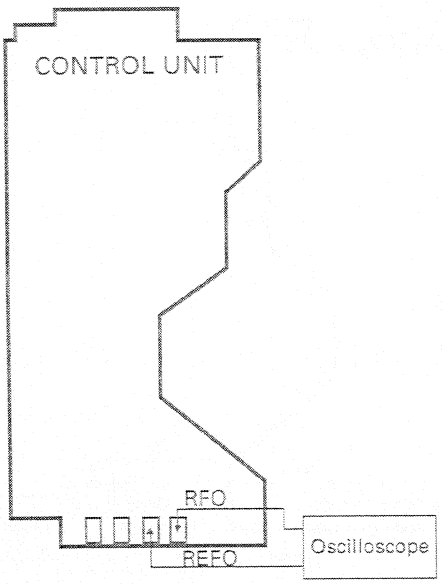
NG

AC Mode Before adjustment Waveform 11

6 RFO Offset Adjustment

·**Purpose**
To adjust the RFO waveform offset to an optimum.
·**Symptoms of Mal-adjustment**
Difficulty in closing focus, poor playability.

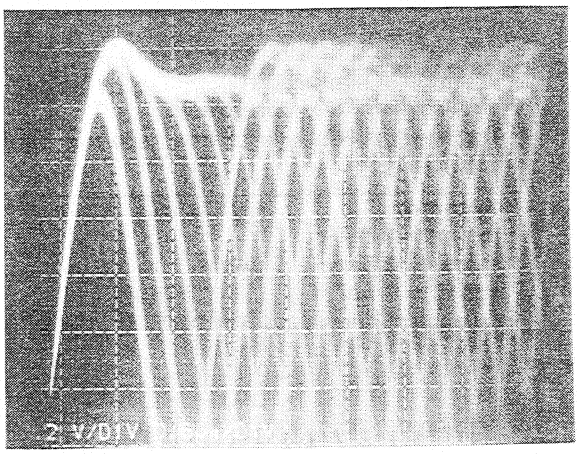
·**Measuring Equipment / Jig**	·Oscilloscope
·**Measuring Point**	·RFO
·**Test Disc , Mode**	·ABEX TCD-784 (or SONY TYPE 4), NORMAL MODE
·**Adjustment Point**	·VR1004 (RFO OFFSET VR)



Adjustment Procedure
1. Play track number 18.
2. Adjust VR1004 so that the peak value of the upper envelope of the RFO waveform is at +1.1VDC w.r.t. REFO(See waveform 12–14).

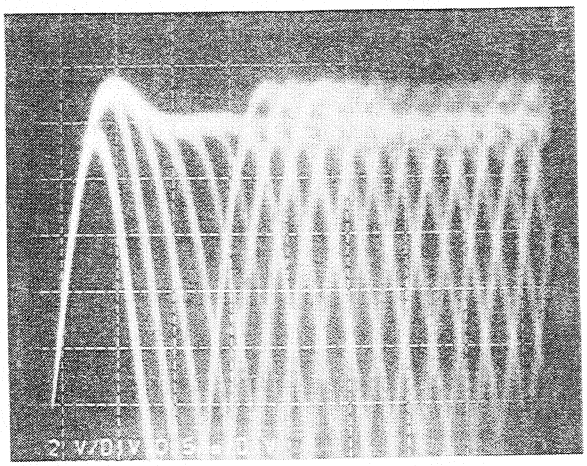
DC Mode
0.2V/div.
0.5µs/div.

+100mV NG



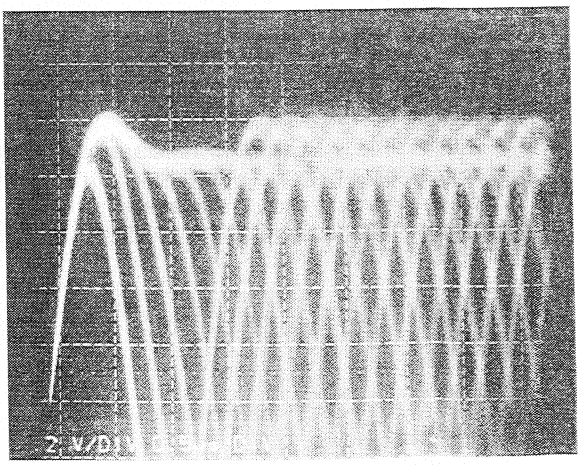
Waveform 12

OK



Waveform 13

-100mV NG

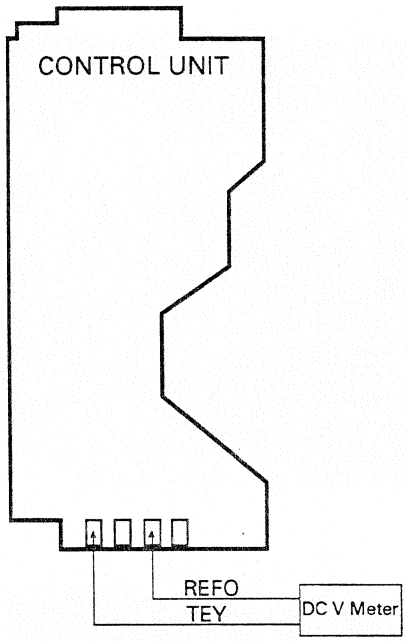


Waveform 14

7 Tracking Error Offset Adjustment 2

·**Purpose :**
To check the offset of the tracking pre-amp is zero and adjust if necessary.
·**Symptoms of Mal-adjustment :**
Track search NG, carriage runaway, poor playability.

·**Measuring Equipment / Jig**	·DC V Meter
·**Measuring Point**	·TEY
·**Test Disc , Mode**	·TEST MODE
·**Adjustment Point**	·VR1001(TE OFFSET VR)

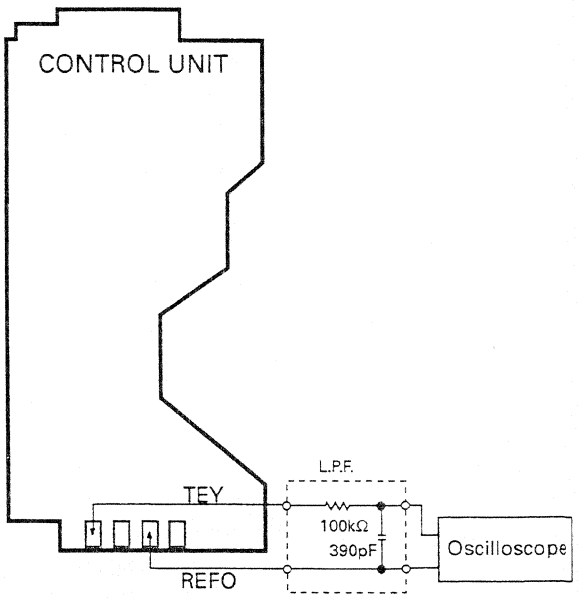


Adjustment Procedure
1. Switch the regulator on.
   Select Focus EQ check in Focus mode by pressing key **TR+** & **TR-**. And the indication 00 will change to 02. This mode makes the laser turned off.
2. Using VR1001, adjust TEY to 0 ± 25mV w.r.t. REFO.

8 Tracking Balance Adjustment 2

·**Purpose :**
To equate the sensitivity of the F channel to that of the E channel.This needs only be done if the TE OFF-SET volume was re-adjusted in the previous step.
·**Symptoms of Mal-adjustment:**
Track search NG, poor playability, carriage runaway.

·**Measuring Equipment / Jig**	·Oscilloscope, L.P.F.
·**Measuring Point**	·TEY
·**Test Disc , Mode**	·ABEX TCD-784 (or SONY TYPE 4), TEST MODE
·**Adjustment Point**	·VR1002 (T.BAL VR)



Adjustment Procedure
1. Load disc and switch the regulator on.
2. Position the PU unit in the center of the disc using the **TR+** & **TR-** keys.
3. Close focus by pressing key **3**.
4. Observing the TEY waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (See waveform 7-9).

Check
After adjustment the TEY waveform should have an amplitude of 1.5±0.65 Vpp.
(ABEX TCD-784 or SONY TYPE 4)

5.2 TUNER SECTION

● **Connection Diagram**

NOTE:
Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.
Z: Output impedance of SSG.

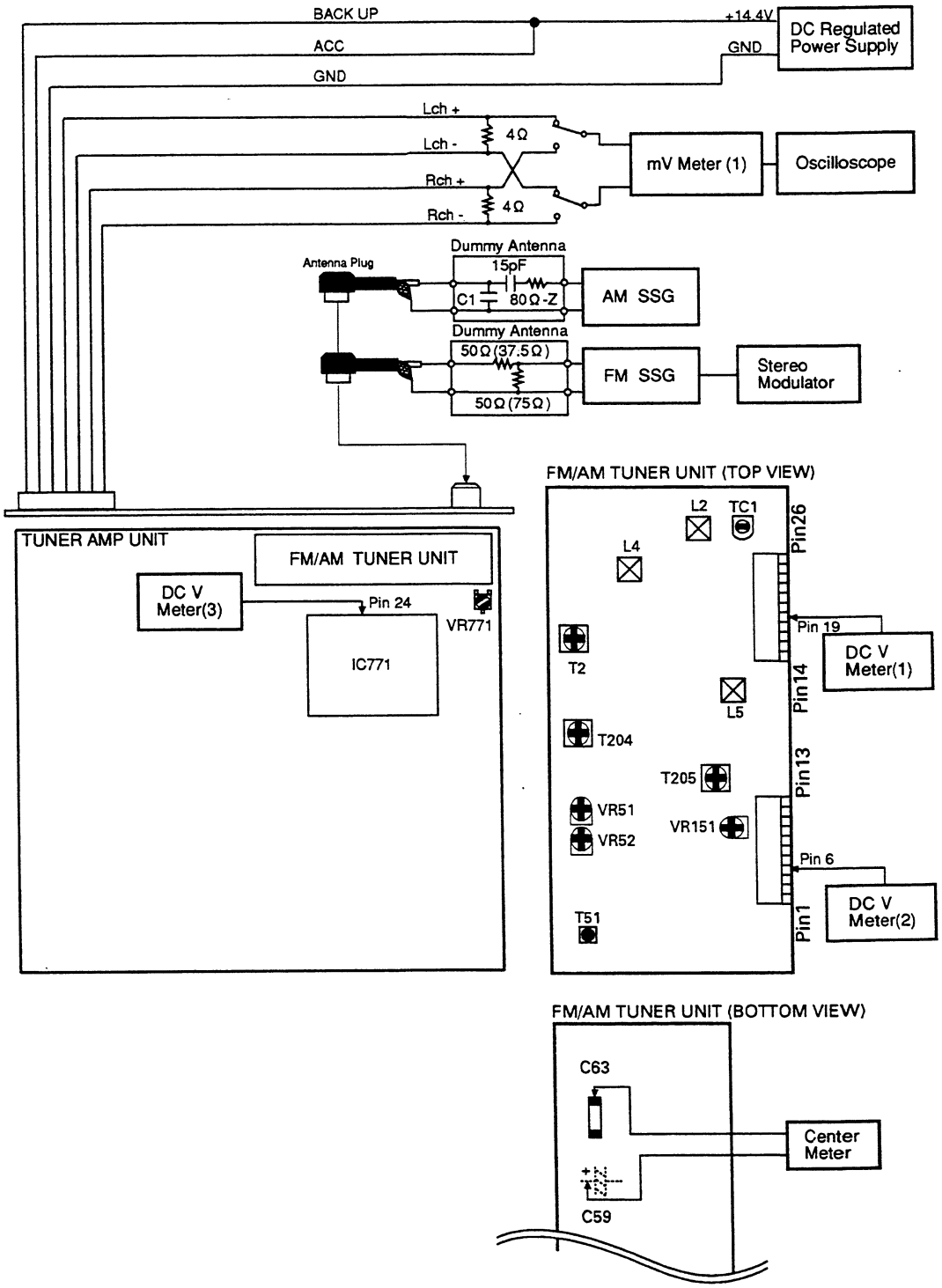


Fig.7

AM ADJUSTMENT

	No.	AM SSG(400Hz,30%)		Displayed	Adjustment	Adjustment Method
		Frequency(kHz)	Level(dBμV)	Frequency(kHz)	Point	(Switch Position)
IF	1	999	20	999	T204,T205	mV Meter(1) : Maximum

FM ADJUSTMENT

Modulation M:MONO MOD., 400Hz 100%(75kHz Dev.)
S:STEREO MOD., 1kHz, L or R=100%(67.5kHz+7.5kHz Dev.)

NOTE:Before proceeding to further adjustments after switching power ON, let the tuner run for ten minutes to allow the circuits to stabilize.

	No.	FM SSG		Displayed	Adjustment	Adjustment Method
		Frequency(MHz)	Level(dBf)	Frequency(MHz)	Point	(Switch Position)
TUN Volt	1	108.0 M	65	108.0	L5	DC V Meter(1) : 6.5V±0.1V
IF	1	98.1 M	65	98.1	T51	Center Meter : 0
TRIMMER	1	•••••	•••••	•••••	TC1	Initial setting(before measurement) of trimmer should be that of Fig.7.
ANT,RF	1	98.1 M	5	98.1	L2,L4	mV Meter(1) : Maximum
IMAGE	1	129.3 M	70—90	107.9	TC1	mV Meter(1) : Minimum
IFT	1	98.1 M	10	98.1	T2	mV Meter(1) : Maximum (STEREO MODE)
Soft Mute	1	98.1 M	65	98.1	•••••	mV Meter(1) : A (STEREO MODE)
	2	98.1 M	15	98.1	VR52	mV Meter(1) : A-3dB
ARC	1	98.1 S	40	98.1	VR151	mV Meter(1) : Separation 5dB
SD	1	98.1 S	22	98.1	VR51	DC V Meter(2) : Approx. 5V

RDS SL ADJUSTMENT

	No.	FM SSG		Displayed	Adjustment	Adjustment Method
		Frequency(MHz)	Level(dBf)	Frequency(MHz)	Point	(Switch Position)
	1	106.1 M	52	106.1	VR771	DC V Meter(3) : 2.25V±0.05V

6. ERROR NUMBERS AND NEW TEST MODE

● Error Number Indication

If the CD should fail to operate or if an error has taken place during operation the player will enter into the error mode, and the cause of the error will be numerically indicated.

This is aimed at assisting in analysis or repair.

(1) Basic Means of Display

·With ERROR indicated in "MODE" on IP-BUS Display data, an error code is transmitted by the use of MIN and SEC. The MIN and SEC data will be identical.

·Examples of Display ERROR-XX

(2) Error Codes

Error Code	Classification	Description	Cause/Detail
10	ELECTRIC	Carriage home failure	Carriage doesn't move to or from the innermost position →Home switch failed and/or carriage immobile
11	ELECTRIC	Focus failure	Focus failed →Defects, disc upside-down, severe vibration
12	ELECTRIC	SETUP failure Subcode failure	Spindle failed to lock or subcode unreadable →Spindle defective, defect, severe vibration
14	ELECTRIC	Mirror failure	Unrecorded CD-R The disc is upside-down, defects, vibration
17	ELECTRIC	Set up failure	AGC protect failed →Defects, disc upside-down, severe vibration
30	ELECTRIC	Search time out	Failed to reach target address →Carriage/tracking defective and/or defects
A0	SYSTEM	Power failure	Power overvoltage or short circuit detected →Switching transistor defective and/or power abnormal

"defects" means scratches, dirt etc an the surface of the disc.

● New Test Mode(aging operation and setup analysis)

The single CD player plays in normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, if any, (and disk number).

During the setup, the CD software operation status (internal RAM and C-point)is displayed.

(1) How to enter NEW TEST Mode

See the test mode flow chart Page 12.

(2) Relations of keys between TEST and NEW TEST Modes

Keys	Test Mode		New Test Mode	
	Regulator OFF	Regulator ON	PLAY in progress	Error Occurred, Protection Activated
BAND/REL	Regulator ON	Regulator OFF	—	Time of occurrence / cause of error select
TR+	—	FWD-Kick	TRACK+ / FF	—
TR-	—	REV-Kick	TRACK- / REV	—
1	—	Tracking close	SCAN	—
2	—	Tracking open	REPEAT	—
3	—	Focus close	RANDOM	—
TR+ & TR-	To New Test Mode	Focus Mode Select	AUTO/MANU	—

Operations, such as EJECT, CD ON/OFF, etc. are performed normally.

(3) Error Cause (Error Number) Code

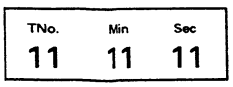
Error Code	Classification	Mode	Description	Cause	Detail
40	ELECTRIC	PLAY	FOK=L	Put out of focus	Scratch, Stain, Vibration, Servo defect, etc...
41	ELECTRIC	PLAY	LOCK=L 150ms	Spindle unlock	
42	ELECTRIC	PLAY	Subcode unacceptable 500ms	Failed to read subcode	
43	ELECTRIC	PLAY	Sound skipped	Last address memory operated	

(4) Indicating an Operation Status During Setup

Status No.	Description	Protection operation
01	Carriage home mode started	None
02	Carriage moving inwards	10-second time out, Home switch failed
03	Carriage moving outwards	10-second time out, Home switch failed
05	Carriage moving outwards	None
11	Setup started	None
12	Spindle turn/Focus search started	None
13	Waiting for focus closure (XSI=L)	Failure to close focus
10,14	Waiting for focus closure (FOK=H)	Failure to close focus
15, 16, 17	Focus closed, Tracking open	Focus disrupted
18	During focus AGC Subcode waiting	Focus disrupted
19	During tracking AGC	Disrupted focus
20	Waiting for MIRR, LOCK or subcode read Carriage closed, SPINDLE=ADAPTIVE	Focus disrupted, MIRR NG, Failure to lock, Failed to read subcode

5) Example of Display.

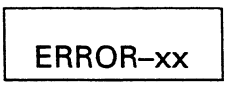
·SET UP in progress



·Operation (PLAY, SEARCH, etc.) in progress perfectly identical with that in the normal mode.

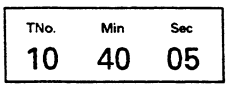
·Protection/Error upon occurrence

(a) Error number indicated



Select the display with the BAND/REL key.

(b) Track number and absolute time indicated



7. ELECTRICAL PARTS LIST

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

=====Circuit Symbol & No. Part Name=====	Part No.
Unit Number : CWE1360	
Unit Name : FM/AM Tuner Unit	
MISCELLANEOUS	
IC 1	PA2021B
IC 2	PA2022B
Q 1	3SK263
Q 2	2SC2712
Q 3	DTC124EU
Q 51	DTC124TU
Q 52	2SC4098
Q 53	2SA1162
Q 190	2SA1586
Q 191 202	2SC2712
Q 201	2SK932
D 1	1SV251
D 2 3 4	KV1410-F1
D 5	MA151WK
D 8 201	MA157-MR
D 191	MA157-MR
D 202	MA110-1A
D 203	SVC253
L 1 Inductor	LCTBR12K2125
L 2 4	CTC1108
L 3	CTC1105
L 5	CTC1107
L 51 Ferri-Inductor	LAU2R2K
L 52 Ferri-Inductor	LAU150K
L 201 Ferri-Inductor	LAU4R7K
L 203 Inductor 1mH	CTF1026
L 204 Ferri-Inductor	LAU151K
L 206 Inductor	LAU3R3K
L 207 Ferri-Inductor	LAU330K
T 2 Coil	CTE1077
T 51 Coil	CTC1119
T 204 Coil	CTE1074
T 205 Coil	CTE1075
TC 1	CCL1038
CF 51 52 201	CTF1292
CF 202	CTF1300
X 151	CSS1308
X 201 Crystal Resonator	CSS1111
VR 51 Semi-fixed 47kΩ (B)	CCP1210
VR 52 Semi-fixed 68kΩ (B)	CCP1211
VR 151 Semi-fixed 10kΩ (B)	CCP1206
AR 1 Capacitor with Discharge Gap	DSP-201M
RESISTORS	
R 1 3 16 20	RS1/16S223J
R 2	RS1/16S331J
R 4 14	RS1/16S563J
R 6	RS1/16S123J
R 8	RS1/16S271J
R 9	RS1/16S153J
R 10 32	RS1/16S682J
R 11	RS1/16S474J
R 13	RS1/16S104J
R 15 103 217	RS1/16S563J
R 17 21 206	RS1/16S332J
R 18	RS1/16S223J
R 22	RS1/16S560J
R 51	RS1/16S391J
R 52	RS1/16S182J
R 53	RS1/16S751J
R 54	RS1/16S823J
R 55 102 161 209 222	RS1/16S822J
R 56	RS1/16S272J
R 60	RS1/16S123J
R 71	RS1/16S272J
R 72	RS1/16S821J
R 73	RS1/16S331J
R 74	RS1/16S681J
R 101	RS1/16S224J
R 104	RS1/16S822J
R 153 159 239	RS1/16S103J
R 154	RS1/16S123J
R 155	RS1/16S822J
R 156	RS1/16S822J
R 157	RS1/16S562J
R 158	RS1/10S682J
R 160	RS1/16S273J
R 190	RS1/16S473J
R 191 207	RS1/16S225J
R 192	RS1/16S221J
R 193	RS1/16S224J
R 194	RS1/16S225J
R 203	RS1/16S102J
R 204 213	RS1/16S222J
R 205	RS1/16S333J
R 208	RS1/16S752J
R 214 218	RS1/16S333J
R 215 224	RS1/16S330J
R 216	RS1/16S152J
R 220	RS1/16S100J
R 221	RS1/16S273J
CAPACITORS	
C 1	CCSQCH220J50
C 2 11 19 29 51 52 62 63	CKSRYB103K50
C 3	CCSRCH470J50
C 4	CCSRRH270J50
C 6	CCSRRH040C50
C 8	CKSRYB102K50
C 9	CCSRCH470J50
C 10	CCSRRH100D50
C 12 13	CCSRCH050D50
C 14 20 21 151 227 228	CKSRYB103K50

=====Circuit Symbol & No. Part Name=====	Part No.
C 15 55 58 101 161	CKSQYB104K16
C 16	CCSRCH020C50
C 17	CCSRRH100D50
C 18	CCSRRH090D50
C 23 56 104 162	CEA010M50LL
C 24 106 213 236	CKSRYB223K25
C 26 28 212	CEA330M10LL
C 27	CKSRYB103K50
C 31 73	CKSRYB333K16
C 32 103 105 206	CKSRYB222K50
C 34	CKSRYB682K50
C 53 54	CCSRCH270J50
C 57 64 66	CCSRCH101J50
C 59	CEAR47M50LL
C 61	CEAR22M50LL
C 72	CKSRYB102K50
C 164 209 210 215 220 223 225 235 239	CKSRYB103K50
C 102 154 156 163 203 219 238	CKSQYB473K16
C 152 153	CKSRYB223K25
C 155	CEAR68M50LL
C 158	CEA100M16LL
C 159	CCSRCH271J50
C 160	CKSYB105K16
C 190	CKSRYB103K50
C 191	CEA150M10LS
C 201	CKSRYB222K50
C 204	CCSRCH151J50
C 205 221	CCSRCH680J50
C 207	CEA470M6R3LL
C 208	CCSRCH330J50
C 211	CKSYB105K16
C 214 230	CKSRYB472K50
C 216	CCSRCH100D50
C 217	CCSRCH221J50
C 218	CEA4R7M35LL
C 222	CCSRCH150J50
C 224	CCSRUJ181J50
C 226	CEA4R7M35LL
C 229	CEAR68M50LL
C 232	CCSRTH180J50
C 233	CKSRYB332K50
C 234	CEA220M6R3LL
C 240	CKSRYB103K50

Unit Number : CWX1796
Unit Name : Control Unit

MISCELLANEOUS

IC 1001		UPC2571GS
IC 1201		UPD63700GF1
IC 1301		PA3026
IC 1302		XRA6285FP
IC 1303		NJM4558M
IC 1601		TC9268F
IC 1602		TA2063F
IC 1701		PQ05TZ51
Q 1001		2SB1260
Q 1601 1602		2SD1781K
Q 1603		2SB709A
D 1601		MA151WA-MN
D 1701 1702 1703 1704		SC016-2
D 1801 1802	Chip LED	CL200IRX
L 1601	Inductor	LCTBR39K2125
X 1601	Crystal Resonator	CSS1067
S 1801 1802	Switch(Home,Clamp)	CSN1028
VR1001	Semi-fixed 2.2kΩ(B)	CCP1177
VR1002	Semi-fixed 22kΩ(B)	CCP1183
VR1003 1004	Semi-fixed 47kΩ(B)	CCP1185

=====Circuit Symbol & No. Part Name=====	Part No.
RESISTORS	
R 1001	RS1/8S100J
R 1002	RS1/8S120J
R 1003 1201 1307 1309	RS1/16S103J
R 1004 1013 1024 1025 1311 1315 1318 1708	RS1/16S102J
R 1005	RS1/16S823J
R 1006	RS1/16S182J
R 1007	RS1/16S333J
R 1011 1012	RS1/16S683J
R 1014 1310	RS1/16S473J
R 1018	RS1/16S622J
R 1019	RS1/16S563J
R 1020	RS1/16S622J
R 1021	RS1/16S513J
R 1022	RS1/16S133J
R 1027	RS1/16S183J
R 1028	RS1/16S822J
R 1301 1302	RS1/16S222J
R 1303 1606 1607	RS1/16S223J
R 1304	RS1/16S123J
R 1305 1306 1705	RS1/16S332J
R 1308	RS1/16S163J
R 1314	RS1/16S0R0J
R 1317	RS1/16S473J
R 1601	RS1/16S301J
R 1604 1605	RS1/16S102J
R 1608 1609	RS1/16S162J
R 1610	RS1/16S103J
R 1801 1802	RS1/8S821J
CAPACITORS	
C 1001 1008 1010 1011 1303	CKSRYB102K50
C 1002 1609 1706	CEV101M6R3
C 1003	CKSQYB104K16
C 1004	CEV470M6R3
C 1005	CCSRCH101J50
C 1006	CKSRYB561K50
C 1007 1704	CKSYB334K16
C 1009	CCSRCH181J50
C 1013	CKSRYB103K50
C 1014	CCSRCH220J50
C 1015 1016 1017 1018 1201 1202	CKSYF105Z16
C 1021	CKSYB104K16
C 1022	CKSRYB332K50
C 1023	CKSRYB561K50
C 1203	CKSRYB471K50
C 1301 1302	CKSRYF683Z25
C 1304	CKSRYB152K50
C 1305	CKSRYB271K50
C 1307 1310 1605 1608	CKSRYB103K50
C 1308	CKSRYF103Z50
C 1309	CEV470M16
C 1601	CCSRCH151J50
C 1602	CCSRCH100D50
C 1603 1604 1705	CKSYB224K16
C 1606 1607	CCSRCH090D50
C 1612	CEV220M6R3
C 1613 1614	CEV4R7M35
C 1701 1702	CCSRCH100D50
C 1703	CEV220M16

=====Circuit Symbol & No. Part Name=====										Part No.
Unit Number : CWX1817										
Unit Name : Tuner Amp Unit										
MISCELLANEOUS										
IC 471										NJM4558L
IC 481										LC7538JMHS
IC 482	483									NJM4558MD
IC 501										LC72140M
IC 551										PA3029B
IC 601										PD4576B
IC 602										PD4402B
IC 603										PDH004A
IC 771										CWV1051
IC 961										PAJ001A
IC 971										PA2023A
Q 451	452	502	504	508	771	773				2SC2712
Q 453	454									DTC343TK
Q 455	456									DTC114TK
Q 457										2SA1162
Q 501										2SC3295
Q 503										2SC3098
Q 505	509									2SK208
Q 510	959									DTA114TS
Q 551	601	604	606	957	983					UN2211
Q 602	982									UN2111
Q 603	607	956								2SB1238
Q 605	958									2SA1048
Q 608										DTC114ES
Q 681										2SC3421
Q 691										2SC2458
Q 772										DTC124EK
Q 981										2SD2396
D 501	971									MA151WK-MT
D 504	505									MA3027
D 551	552	553	554	555	556	557	558	957	961	ERA15-02
D 601										MA151WK-MT
D 602										MTZ4R7JA
D 603	604	611	612	613	614	615	616	683	684	1SS133
D 681										HZS9LB2
D 682										HZS6LC2
D 685	686	771	953	958	959	972	973			1SS133
D 772										MTZ4R7B
D 951										ERC05-10B
D 956										ERA15-10
D 962										MA719
D 981										RB100AVH
D 984										HZS9LC3
L 501										Ferri-Inductor CTF-157
L 502	601	602	701							Inductor LPSQ2R2K
L 603										Inductor LPSQ220K
TH 601										Thermistor CCX1008
X 501										Crystal Resonator CSS1011
X 601										Crystal Resonator CSS1023
X 602										Ceramic Resonator CSS1029
VR 771										Semi-fixed 4.7kΩ (B) VRMB6VS472
BZ 601										Buzzer CPV1011
										FM/AM Tuner Unit CWE1360
										Connector Unit CWX1879
RESISTORS										
R 451	452									RS1/10S272J
R 455	456	457	458	463	464	529	533	536	538	RS1/10S102J
R 459	460	475	476	505	952	956				RS1/10S223J
R 467	468	489	491	493	495	507	531	665	697	RS1/10S103J
R 471	472	782								RS1/10S332J

=====Circuit Symbol & No. Part Name=====										Part No.
R 473	474									RD1/4PS153JL
R 477	478									RD1/4PS331JL
R 485	486	487	566	567	568	569	633	966		RD1/4PS472JL
R 488	490	492	494	698						RS1/10S682J
R 503	508	509	512	516	530	627	629	630	632	RS1/10S472J
R 504	511	513	534	535	601	603	641	680		RS1/10S222J
R 506	526	696								RS1/10S221J
R 510										RS1/10S123J
R 514	515	521	522	602	604	618	619	621	671	RS1/10S473J
R 517	518	519	520	622	678					RD1/4PS222JL
R 523										RS1/10S563J
R 524	784									RS1/10S101J
R 525										RS1/10S821J
R 527										RS1/10S221J
R 528										RS1/10S680J
R 532	781									RS1/10S152J
R 539	540	541	547	605	606	609	610	616	651	RS1/10S102J
R 542										RS1/10S822J
R 543	614									RS1/10S330J
R 551	552	553	554							RS1/10S472J
R 555	556									RS1/10S2R2J
R 557	607	959	965							RD1/4PS102JL
R 558	559	560	561	562	563	564	565			RD1/4PS2R2JL
R 570										RD1/4PS122JL
R 571										RS1/10S332J
R 572										RS1/10S122J
R 617										RD1/4PS473JL
R 620										RS1/10S683J
R 623	625	971								RS1/10S104J
R 624										RD1/4PS222JL
R 626										RS1/10S183J
R 628	958									RD1/4PS272JL
R 634	636	637	638	645	646	647	684	957	968	RS1/10S472J
R 635										RD1/4PS100JL
R 639										RD1/4PS103JL
R 640	771									RS1/10S471J
R 652	657	658	659	660	662	663	664	695	780	RS1/10S102J
R 653	654	655	656							RS1/10S681J
R 666	983									RS1/10S393J
R 667										RS1/10S155J
R 668	669	670	674	675	676	685	981			RD1/4PS471JL
R 672	673	677	679	686	687	688	689	693	694	RS1/10S473J
R 681	690									RD1/4PS4R7JL
R 692										RS1/10S0R0J
R 699										RS1/10S0R0J
R 772	773	774	775	776	777	778	967	975	984	RS1/10S473J
R 783										RS1/10S103J
R 951										RS1/10S513J
R 960										RD1/4PS3R3JL
R 961										RD1/4PS823JL
R 962										RS1/10S363J
R 963										RS1/10S684J
R 964										RS1/10S474J
R 969										RS1/10S273J
R 972										RS1/10S102J
R 973										RS1/10S472J
R 974	976									RS1/10S103J
R 977										RS1/10S105J
R 982										RD1/4PS221JL
CAPACITORS										
C 451	452	516	575							CEA4R7M35LL
C 471	472	481	482	483	484	485	486	491	492	CEA100M16LL
C 473	474									CCSQCH560J50
C 475	951	963		1000μF/16V						CCH1149
C 487	488									CKSYB224K25

=====Circuit Symbol & No. Part Name=====										Part No.
C	489	490								CKSQYB272K50
C	493	494	506	507	610	958				CKSQYB223K50
C	495	496								CKSQYB562K50
C	497	498	499	500	612	613				CCSQCH330J50
C	501	505	509	512	517	701				CCSQCH101J50
C	502	513	602	603	607	622	628	682	957	982 CKSQYB473K50
C	504	510	514	523	524	772	952	954		CKSQYB103K50
C	511									CKSQYB681K50
C	515									CFTNA474J50
C	518	519								CCSQCH120J50
C	520				4.7μF/16V					CCH1005
C	551	552	554	555	614	615	616	617	618	619 CKSQYB102K50
C	553	567	568	569	570	773				CEA100M16LL
C	556				3300μF/16V					CCH1150
C	557	558	601	609	627					CKSQYB104K25
C	559	560	561	562	563	564	565	566		CFTNA104J50
C	604	605								CCSQCH150J50
C	608	681	953	956	971					CEA010M50LL
C	611									CKSYF105Z25
C	620									CKSQYB472K50
C	621				0.47μF/5.5V					CCL1014
C	691									CEA0R1M50LL
C	692									CASA6R8M6R3
C	771									CEAR47M50LL
C	962									CEAR22M50LL

=====Circuit Symbol & No. Part Name=====										Part No.
C	964									CEA330M10LL
C	965									CEA220M6R3LL
C	966									CEA2R2M50LL
C	972									CEA470M10LL
C	973									CEA101M10LL
C	974									CEAS221M10
C	975									CEAS331M10
C	981									CEAS331M16
C	983									CKSQYB102K50

Unit Number : CWX1879
Unit Name : Connector Unit

L	951	Coil	CTH1113
FU	901	Fuse 10A	CEK1136
C	991		CEAS471M16
C	992	993	CKDYB222K50

Unit Number :
Unit Name : Detector P.C.Board

P	1	2	Photo Transistor	PT4800

Miscellaneous Parts List

		PU Unit	CGY1031
M	1	Motor Unit (Spindle)	CXA5703
M	2	Motor Unit (Carriage)	CXA7150
M	3	Motor Unit (Loading)	CXA6456

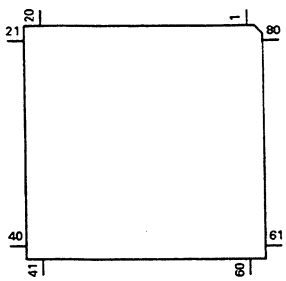
● **ICs**

● **Pin Functions (PD4576B)**

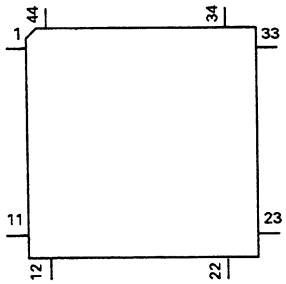
Pin No.	Pin Name	I/O	I/O Format	Function and Operation
1	ANTSENS	I		Anti-theft sense input
2	$\overline{\text{RDSRST}}$	O	C	Reset output for RDS IC
3	RDSSEL	O	C	Select output for RDS IC
4	AVSS			A/D GND
5	$\overline{\text{RDSEN}}$	O	C	Enable output for RDS IC
6	RDSRDY	I		Ready input from RDS IC
7	AVREF1	I		A/D converter reference voltage
8	KYDT	I		Key data input
9	DPDT	O	C	Display data output
10	$\overline{\text{RST}}$	O	C	LSI reset output
11	RDSDI	I		Serial data input for RDS IC
12	RDSDO	O	C	Serial data output for RDS IC
13	$\overline{\text{RDSCK}}$	O	C	Serial clock output for RDS IC
14	A0	O	C	LSI data control signal
15	$\overline{\text{STB}}$	O	C	LSI Strobe output
16	XSI	I		LSI data input
17	XSO	O	C	LSI data output
18	$\overline{\text{XSCK}}$	O	C	LSI clock output
19	CONT	O	C	Servo driver power supply control
20	LOAD	O	C	Loading motor LOAD control
21	EJET	O	C	Loading motor EJECT control
22	POWER	O	C	CD +5V control
23	NC			Not used
24	CDMUTE	O	C	CD mute output
25	$\overline{\text{TMUTE}}$	O	C	Tuner mute output
26	VDCNT	O	C	VD control output
27	FOK	I	C	FOK signal input
28	MIRR	I	C	Mirror detector input
29	LOCK	I	C	Spindle lock detector input
30	CLAMP	I		Disc clamp sense input
31	$\overline{\text{HOME}}$	I	C	Home position detector input
32	ILMIN	I		Illumination input
33	VSS			GND
34	VDSENS	I	C	VD over voltage sense input
35	VMC			Not used
36	NC			Not used
37	$\overline{\text{ADENA}}$	O	C	AVREF enable output
38	NC			Not used
39	CDPW	O	N	CD power control
40	VDT	O	C	Data output for electronic volume
41	SYSPW	O	C	System power supply control output
42	BLGT	O	C	LCD back light control output
43	VLCDPW	O	C	Power supply control output for LCD driver
44	$\overline{\text{SWVDD}}$	O	C	Key board unit power supply control output
45	PEE	O	C	Beep tone output
46	PEE2	O	C	Beep tone output for anti-theft
47	VST	O	C	Strobe pulse output for electronic volume
48	VCK	O	C	Clock output for electronic volume
49	PCL	O	C	Clock adjustment output
50	FM/$\overline{\text{AM}}$	O	C	FM/AM power select output
51	MONO	O	C	Forced mono output
52	NC			Not used
53	SIMUKE2	I		Model select input
54	ES/$\overline{\text{EW}}$	I		Model select input
55	TEL	I		TEL mute input
56	MUTE	O	C	Mute output

Pin No.	Pin Name	I/O	I/O Format	Function and Operation
57	EDI	I		Serial data input from EEPROM
58	ECE	O	C	Chip enable output for EEPROM
59	SD	I		Tuner SD input
60	$\overline{\text{RESET}}$	I		Reset input
61	$\overline{\text{REMIN}}$	I		Remote control signal input
62	$\overline{\text{BSENS}}$	I		Back up power sense input
63	$\overline{\text{ASENS}}$	I		ACC power sense input
64	ELDI	I		Data input from external IC
65	ELXDT	O	C	Data output for external IC
66	ELXCK	O	C	Serial clock output for external IC
67	PCE	O	C	Chip enable output for PLL IC
68	VDD			Power supply
69	X2			Crystal oscillator connection pin
70	X1			Crystal oscillator connection pin
71	IC			Connect to GND
72	XT2			Not used
73	TESTIN	I		Test program mode input
74	AVDD			Positive power supply terminal for A/D converter
75	AVREF0	I		A/D converter reference voltage
76	SL	I		Signal level input from tuner
77	TEMP	I		Temperature detector
78	DINC	I		Disc insert sense input
79	EJTD	I		Disc eject position sense input
80	DSENS	I		Grille detach sense

*PD4576B



*PD4402B



I/O Format	Meaning
C	CMOS
N	N channel open drain

IC's marked by are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

● Pin Functions (PD4402B)

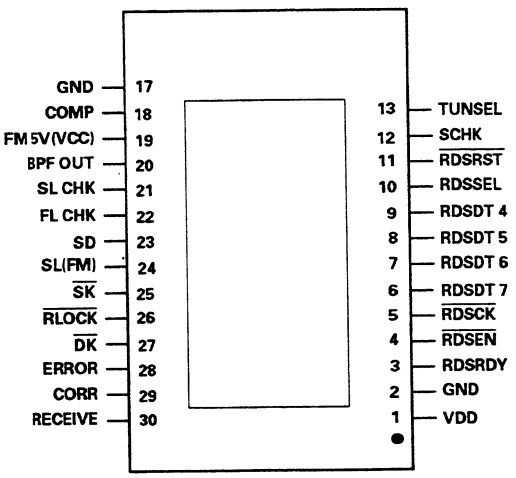
Pin No.	Pin Name	I/O	I/O Format	Function and Operation
1–3	IN1,IN0,IN2	I		Remote control key return input
4–7	NC			Not used
8	REMOUT	O	C	Key data output
9–16	NC			Not used
17	VSS			GND
18–23	NC			Not used
24	X2			Crystal oscillator connection pin
25	X1			Crystal oscillator connection pin
26	VDD			Power supply
27–29	NC			Not used
30	VSS			GND
31	RST	I		Reset input
32–41	NC			Not used
42	L5	O	N	Remote control key strobe output
43,44	L1,L0	O	N	Remote control key strobe output

I/O Format	Meaning
C	CMOS
N	N channel open drain

● Pin Functions (CWV1051)

Pin No.	Pin Name	I/O	Function and Operation
1	VDD		Power supply for RDS controller
2	GND		GND
3	RDSRDY	I	Ready input from system control IC
4	$\overline{\text{RDSEN}}$	O	Enable output for system control IC
5	$\overline{\text{RDSCK}}$	I	Serial clock input from system control IC
6-9	RDSDT 7-4	I/O	Data input/output to system control IC
10	RDSSEL	I	Select input from system control IC
11	$\overline{\text{RDSRST}}$	I	Reset input from system control IC
12	SCHK	I	Unit check input
13	TUNSEL	I	FM/AM tuner unit select input
14-16	VACANT		
17	GND		GND
18	COMP	I	FM composite signal input
19	FM 5V(VCC)		Power supply decoder
20	BPF OUT	O	Band pass filter test output
21	SL CHK	O	SL check output
22	FL CHK	O	FL check output
23	SD	I	RDS decode control input
24	SL(FM)	I	Signal level input from tuner
25	$\overline{\text{SK}}$	I	SK signal detect input
26	$\overline{\text{RLOCK}}$	O	RDS test output
27	$\overline{\text{DK}}$	O	DK signal detect output
28	ERROR	O	Disapprove of error correction output
29	CORR	O	Error output
30	RECEIVE	O	RDS synchronizing test output

CWV1051



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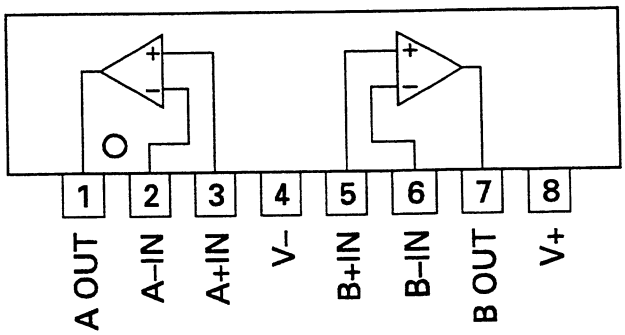

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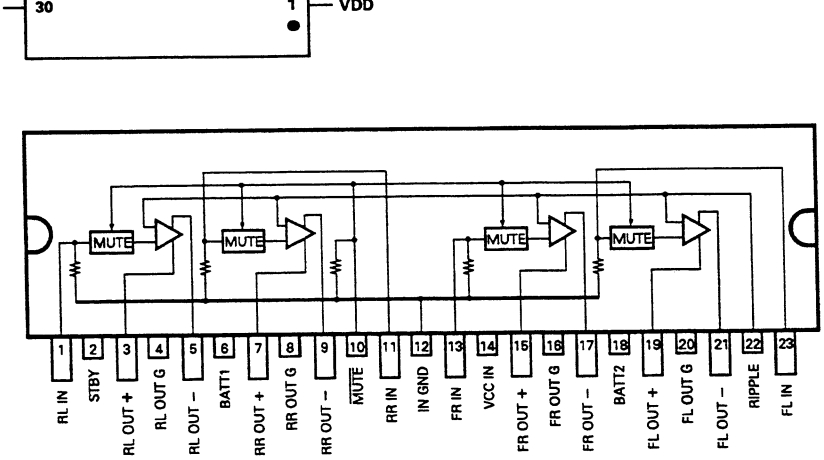
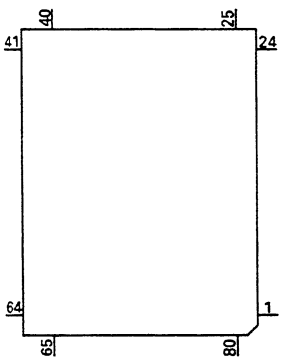


● **Pin Functions(UPD63700GF1)**

Pin No.	Pin Name	I/O	Function and Operation
1	D.GND		Logic circuit GND
2	RFOK	O	RFOK detection signal output terminal
3	MIRR	O	MIRR detection signal output terminal
4	TBC	I	Tracking filter bank switching terminal
5	HOLD	I	Hold control signal input terminal
6	D.VDD		VDD for logic circuit
7	$\overline{RST}$	I	System reset
8	AO	I	Control signal distinguishing data from microcomputer
9	$\overline{STB}$	I	Signal latching serial data inside LSI
10	$\overline{SCK}$	I	Clock input terminal for serial data input and output
11	SO	O	Serial data and status signal output
12	SI	I	Serial data input
13	TM2	I	Double speed playback control terminal
14	D.GND		Logic circuit GND
15	TEST	I	Test terminal
16	STBY	I	Stand-by input terminal
17	CTLV	I	Control terminal for clock generation VCO used by digital PLL in double speed playback mode
18	POUT	O	Output terminal for phase comparison between EFM signal and bit clock
19	D.GND		Logic circuit GND
20	VCO	I	Inverter input
21	$\overline{VCO}$	O	Inverter output
22	D.VDD		VDD for logic circuit
23	PLCK	O	Bit clock monitor terminal
24	LOCK	O	"H" when synchronization signal and frame counter output coincide at EFM demodulator
25	WFCK	O	Signal issuing one-frame period by bit clock dividing signal
26	RFCK	O	Oscillation clock divider signal,output pin for signal giving 1-frame sync
27	C4M	O	Output terminal for signal having four the frequency of LRCK
28	C16M	O	Oscillation clock output terminal
29	D.GND		Logic circuit GND
30	XTAL	I	Oscillation continuation terminal
31	$\overline{XTAL}$	O	Oscillation continuation terminal
32	D.VDD		VDD for logic circuit
33	SCKO	O	Clock output terminal for audio serial data
34	LRCK	O	Signal distinguishing between left and right channel DOUT terminal output
35	DOUT	O	Serial audio data output terminal
36	TX	O	Digital audio interface data output terminal
37	FLAG	O	Flag signal indicating that the current audio data output of incorrectable data
38	EMPH	O	Emphasis information output
39	WDCK	O	Output terminal for signal having double the frequency of LRCK
40	C2D3	O	Output terminal indicating C2 error correction status
41	SFSY	O	Signal indicating subcode one-frame synchronization
42	SBSY	O	Signal indicating head of subcode block
43	SBSO	O	Subcode data output terminal
44	SBCK	I	Subcode data read clock input terminal
45	D.GND		Logic circuit GND
46,47	C1D1,C1D2	O	Output terminal indicating C1 error correction status
48,49	C2D1,C2D2	O	Output terminal indicating C2 error correction status
50	T4	I	Selects between focus and tracking modulation mode
51	T5	I	Selects motor PWM output mode
52	T6	I	Sets focus PWM output mode
53	T7	I	Sets tracking PWM output mode
54	D.VDD		VDD for logic circuit
55	MRD	O	PWM negative output terminal for the spindle loop filter
56	MFD	O	PWM positive output terminal for the spindle loop filter
57	SRD	O	PWM negative output terminal for the thread loop filter
58	SFD	O	PWM positive output terminal for the thread loop filter

Pin No.	Pin Name	I/O	Function and Operation
59	D.GND		Logic circuit GND
60	TRD	O	PWM negative output terminal for the tracking loop filter
61	TFD	O	PWM positive output terminal for the tracking loop filter
62	FRD	O	PWM negative output terminal for the focus loop filter
63	FFD	O	PWM positive output terminal for the focus loop filter
64	D.VDD		VDD for logic circuit
65	OUTSEL	I	Sets PWM output mode for the motor system
66	TEC1	I	Tracking error input terminal
67	TEC0	I	Tracking error input terminal
68	A.VDD		VDD for analog circuit
69,70	VR2,VR1	I	A/D converter input
71	TE	I	Tracking error input terminal
72	FE	I	Focus error input terminal
73	RFB	I	RFB signal input terminal
74	RFP	I	RFP signal input terminal
75	A.GND		Analog circuit GND
76	REFOUT	O	A/D converter midpoint voltage output terminal inside LSI
77	RFI	I	RF signal input terminal for EFM comparator
78	ASI	I	Level comparing input for RF signal comparison
79	EFM	O	EFM signal output terminal
80	A.VDD		VDD for analog circuit

*UPD63700GF1



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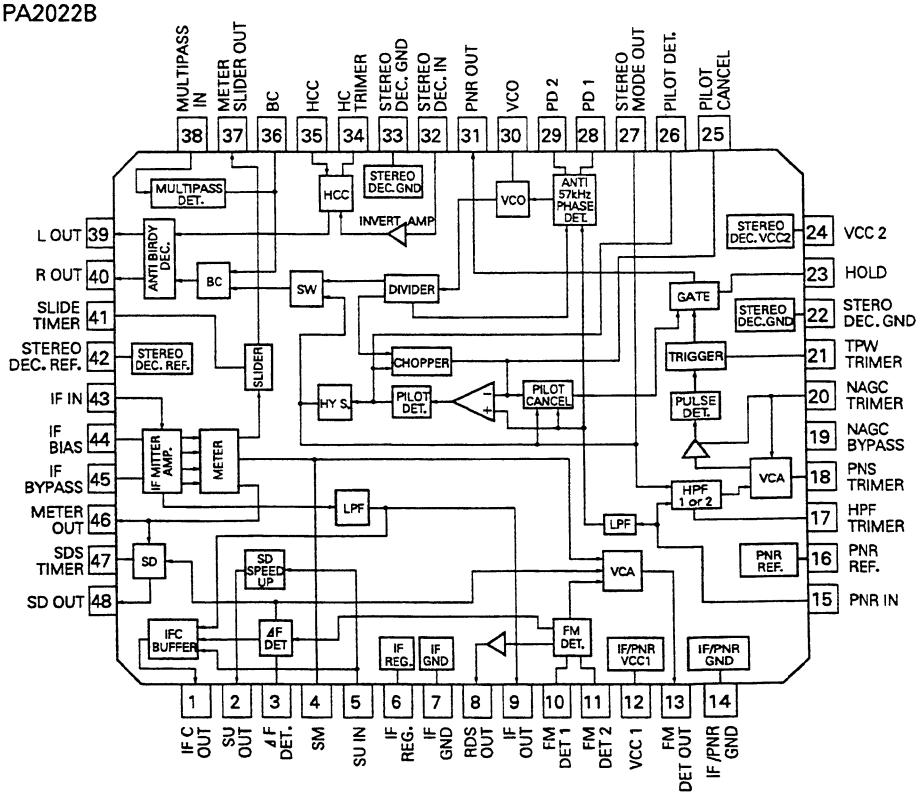
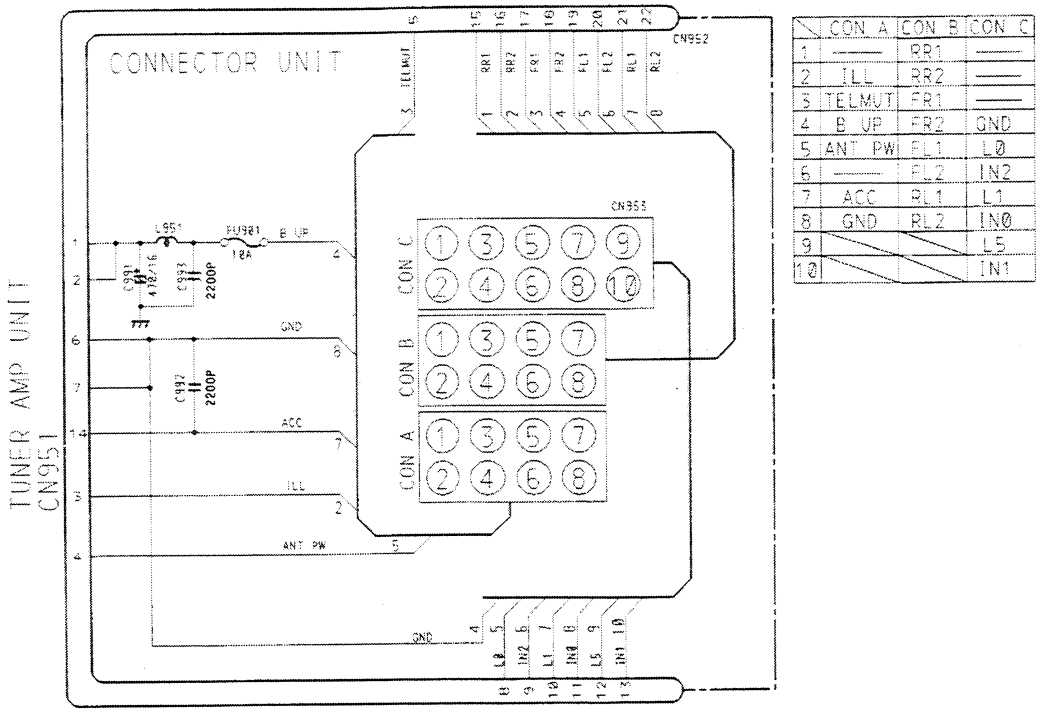


8. CIRCUIT DIAGRAM AND PATTERN

8.1 CONNECTOR UNIT

● Circuit Diagram



	CON A	CON B	CON C
1	——	RR1	——
2	ILL	RR2	——
3	TELMUT	FR1	——
4	B UP	FR2	GND
5	ANT PW	FL1	L0
6	——	FL2	IN2
7	ACC	RL1	L1
8	GND	RL2	IN0
9			L5
10			IN1

Fig.8

● Connection Diagram

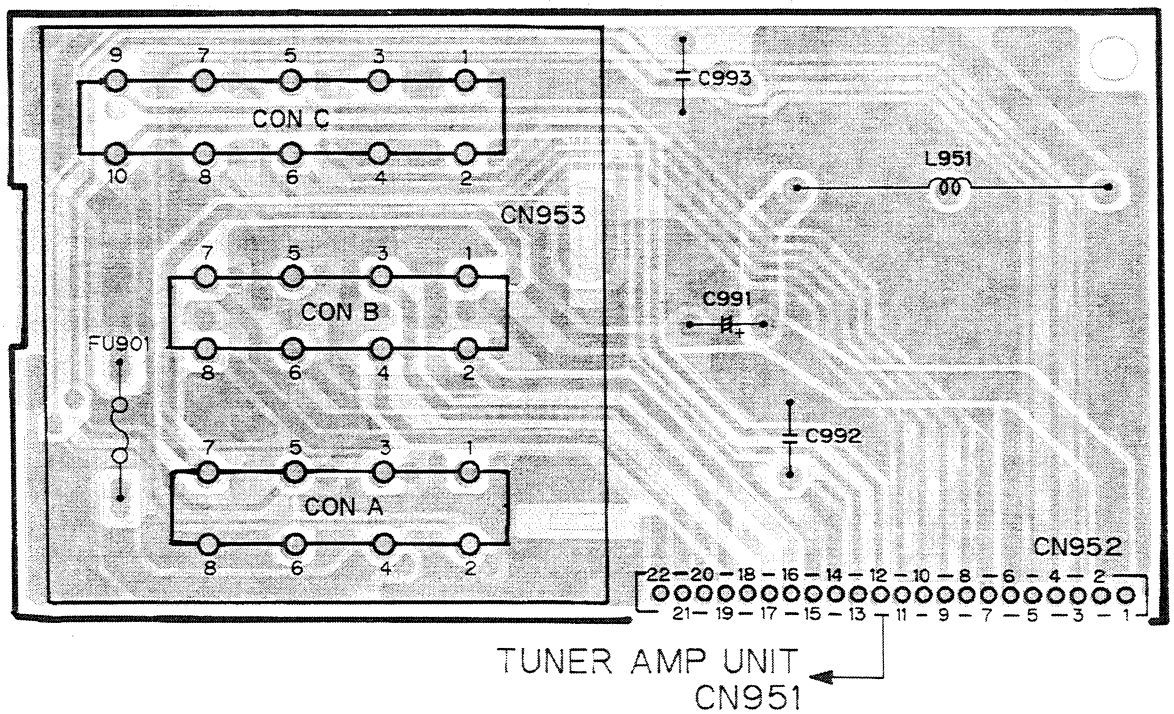
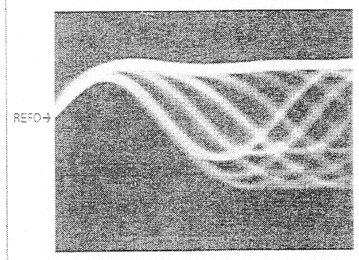


Fig.9

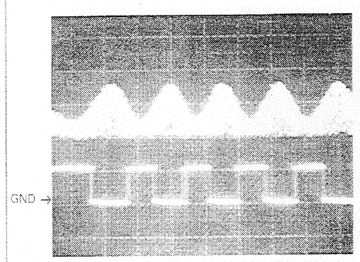
Waveforms

Note: 1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFO: 2.5V

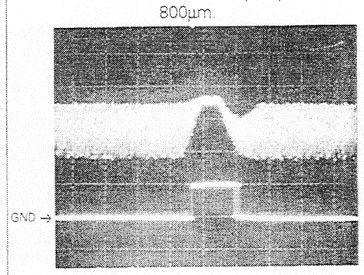
① RFO 0.5V/div. 0.2µs/div.
Normal mode: play



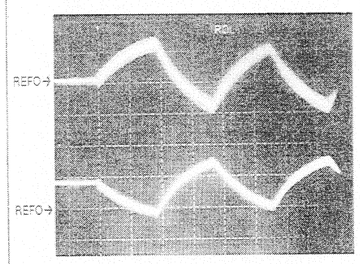
① CH1: RFO 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Test mode: Tracking open



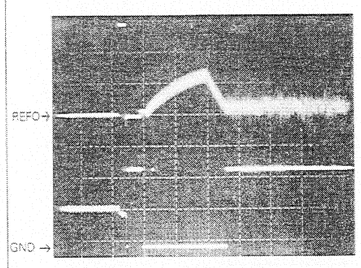
① CH1: RFO 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Normal mode: The defect part passes 800µm.



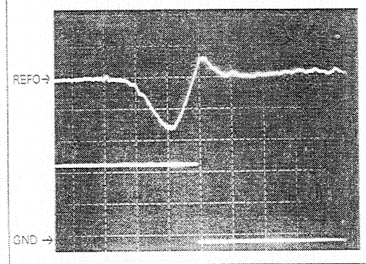
③ CH1: FIN 0.5V/div.
④ CH2: FO+ 2V/div. 0.2s/div.
Test mode: No disc, Focus close



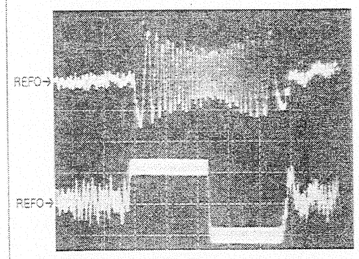
③ CH1: FIN 0.5V/div.
⑤ CH2: FOK 2V/div. 0.2s/div.
Normal mode: Focus close



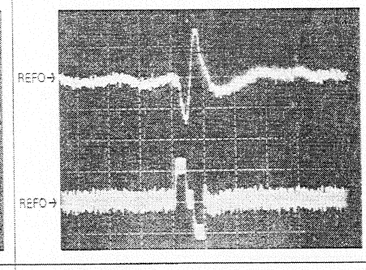
⑥ CH1: FEY 0.5V/div.
⑦ CH2: XSO 2V/div. 1ms/div.
Normal mode: Focus close



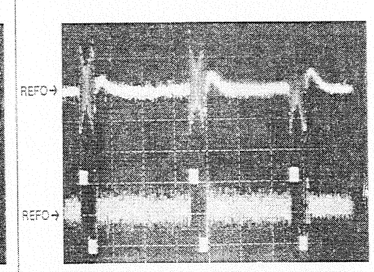
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Test mode: 32 track jump (FWD)



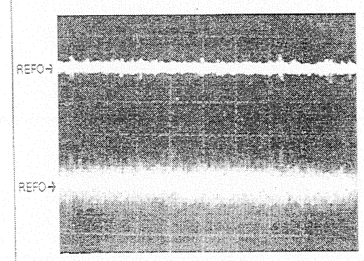
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Test mode: Single jump (FWD)



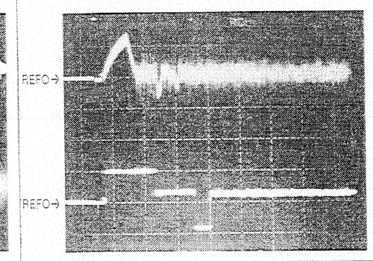
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 5ms/div.
Test mode: 100 track jump (FWD)



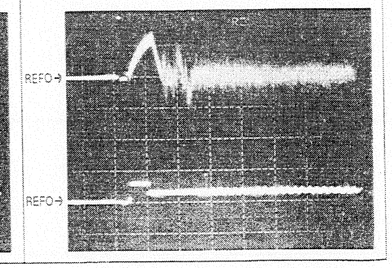
⑥ CH1: FEY 0.2V/div.
③ CH2: FIN 0.5V/div. 20ms/div.
Normal mode: Play



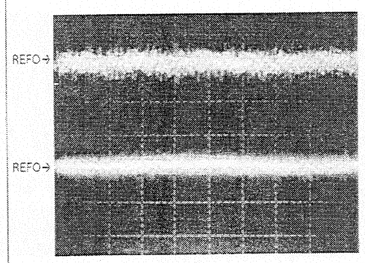
③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus close (12cm)



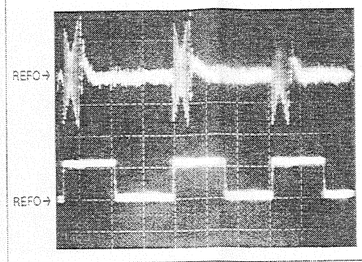
③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus close (8cm)



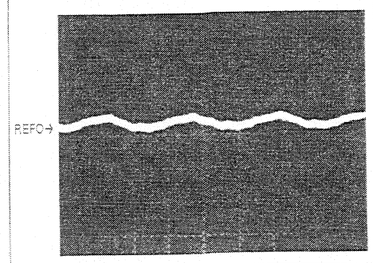
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 20ms/div.
Normal mode: Play



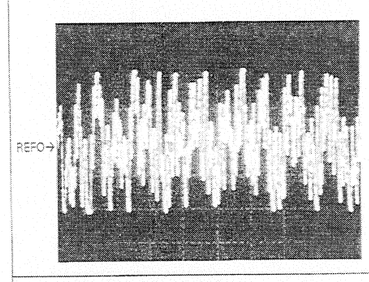
⑧ CH1: TEY 0.5V/div.
㉓ CH2: CIN 0.5V/div. 5ms/div.
Test mode: 100 track jump (FWO)



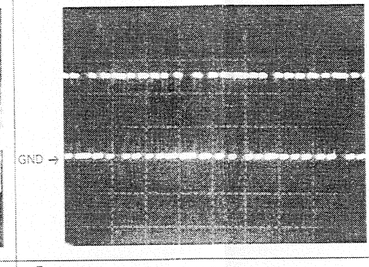
⑩ SIN 0.5V/div. 50ms/div.
Normal mode: 1Play (12cm disc)



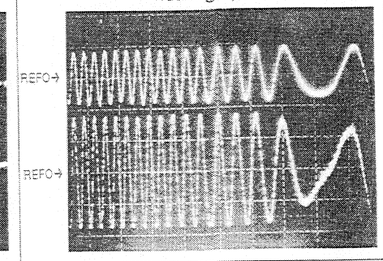
⑩ SIN 0.5V/div. 10ms/div.
Search (12cm disc)



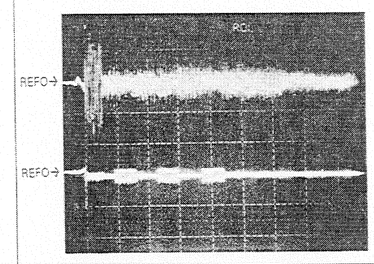
⑪ EFM 2V/div. 5µs/div.
Play



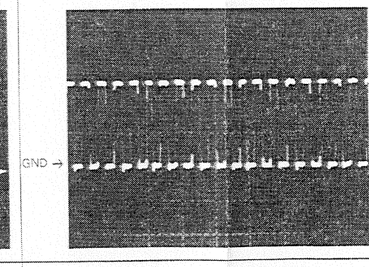
⑧ CH1: TEY 1V/div.
⑫ CH2: TEC 1V/div. 2ms/div.
Test mode: Focus closed
Tracking open



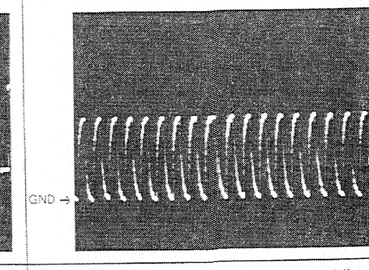
⑧ CH1: TEY 0.5V/div.
⑥ CH2: FEY 0.5V/div. 0.1s/div.
Normal mode: AGC after focus close



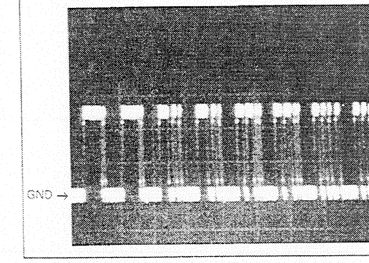
⑮ PLCK 2V/div. 0.5µs/div.
Play



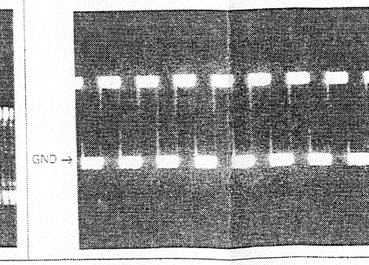
⑯ SCKO 2V/div. 1µs/div.
Play



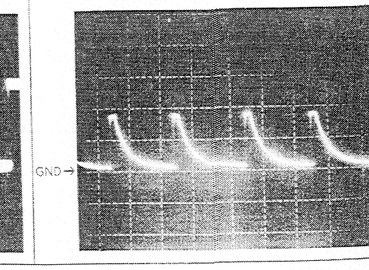
⑰ Dout 2V/div. 10µs/div.
Play

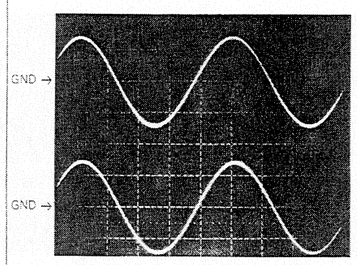
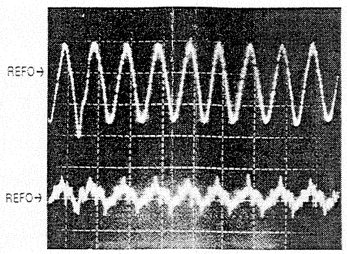
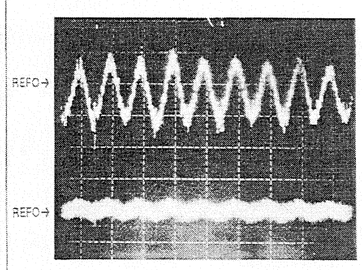


⑱ LRCK 2V/div. 20µs/div.
Play



⑲ VD 5V/div. 50ms/div.
Normal mode: No disc

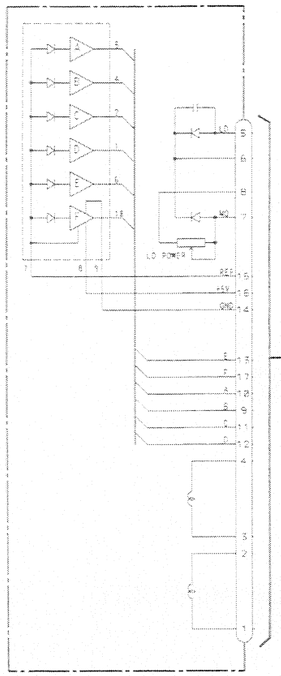


㉒ CH1: R OUT 1V/div. ㉑ CH2: L OUT 1V/div. 0.2ms/div. Normal mode: Play (1kHz 0dB) 	⑥ CH1: FEY 1V/div. ③ CH2: FIN 1V/div. 1ms/div. Normal mode: During AGC 	⑧ CH1: TEY 0.2V/div. ⑨ CH2: TIN 0.5V/div. 1ms/div. Normal mode: During AGC 

8.2 CD MECHANISM MODULE

● Connection Diagram

PU UNIT



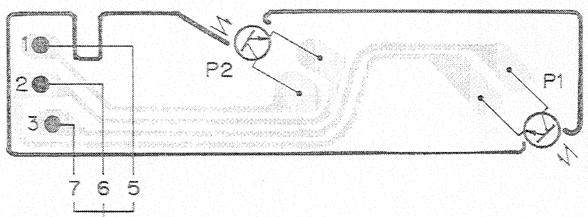
CONTROL UNIT
CN1001

M1
SPINDLE MOTOR

M2
CARRIAGE MOTOR

DETECTOR
P.C.BOARD

DETECTOR P.C.BOARD

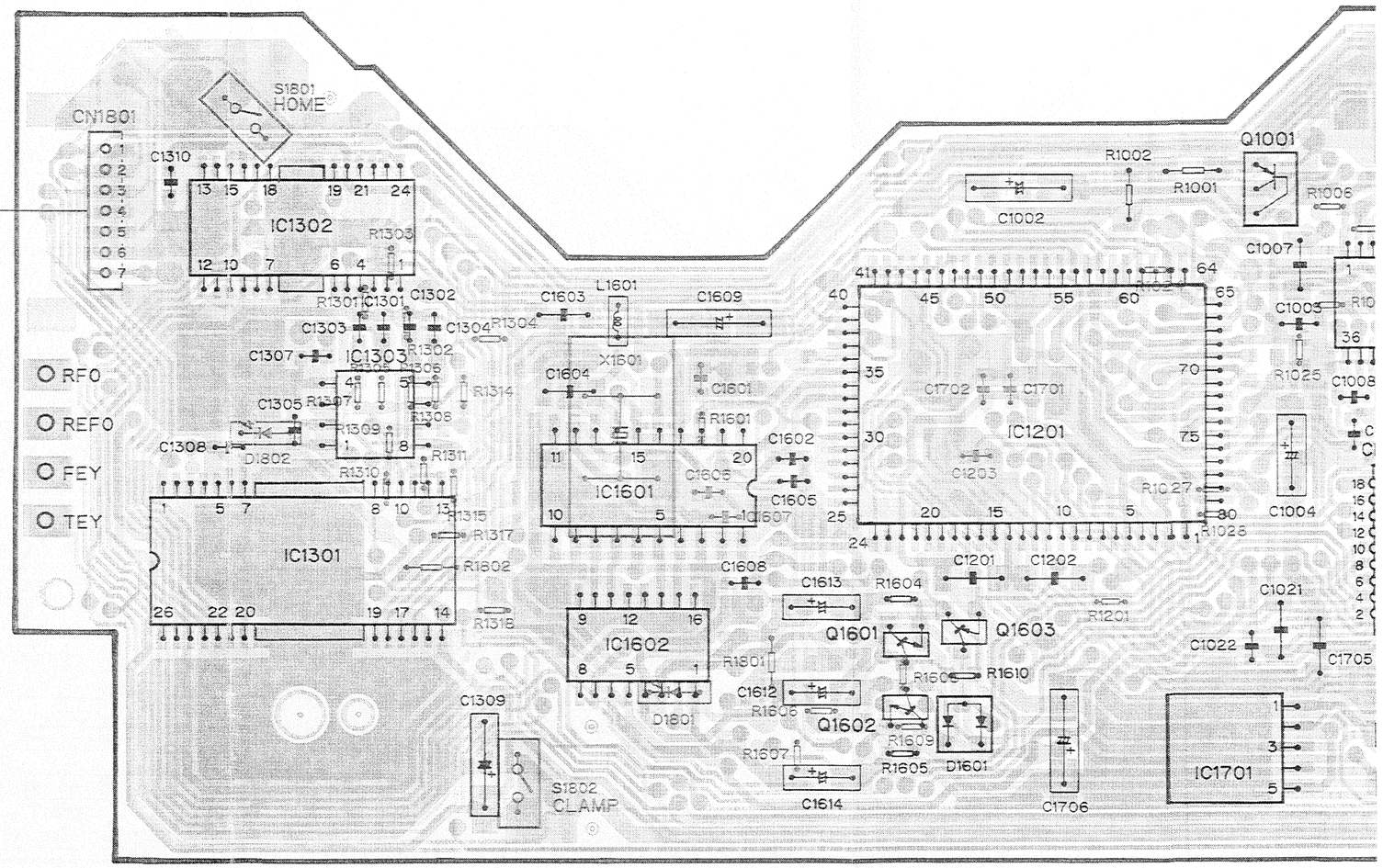


CONTROL UNIT
CN1801

CONTROL UNIT

IC, Q: IC1302 IC1301 IC1303 | IC1601 IC1602 | Q1601 Q1602 Q1603 IC1201 | IC1701 Q1001

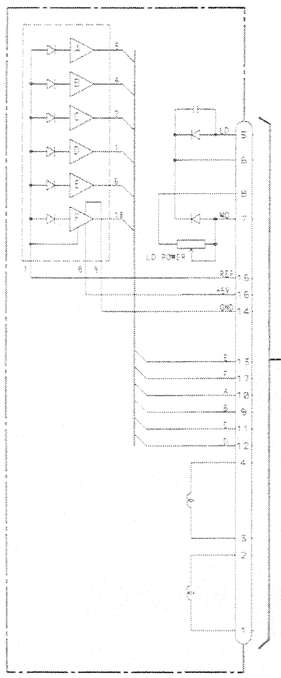
ADJ



8.2 CD MECHANISM MODULE

● Connection Diagram

PU UNIT



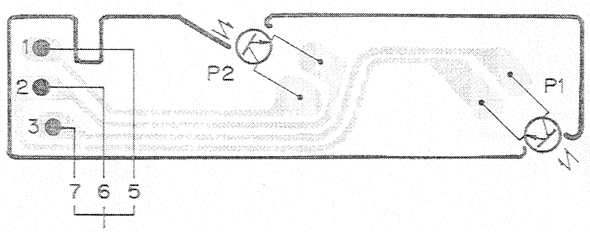
CONTROL UNIT CN1001

M1 SPINDLE MOTOR

M2 CARRIAGE MOTOR

DETECTOR P.C.BOARD

DETECTOR P.C.BOARD

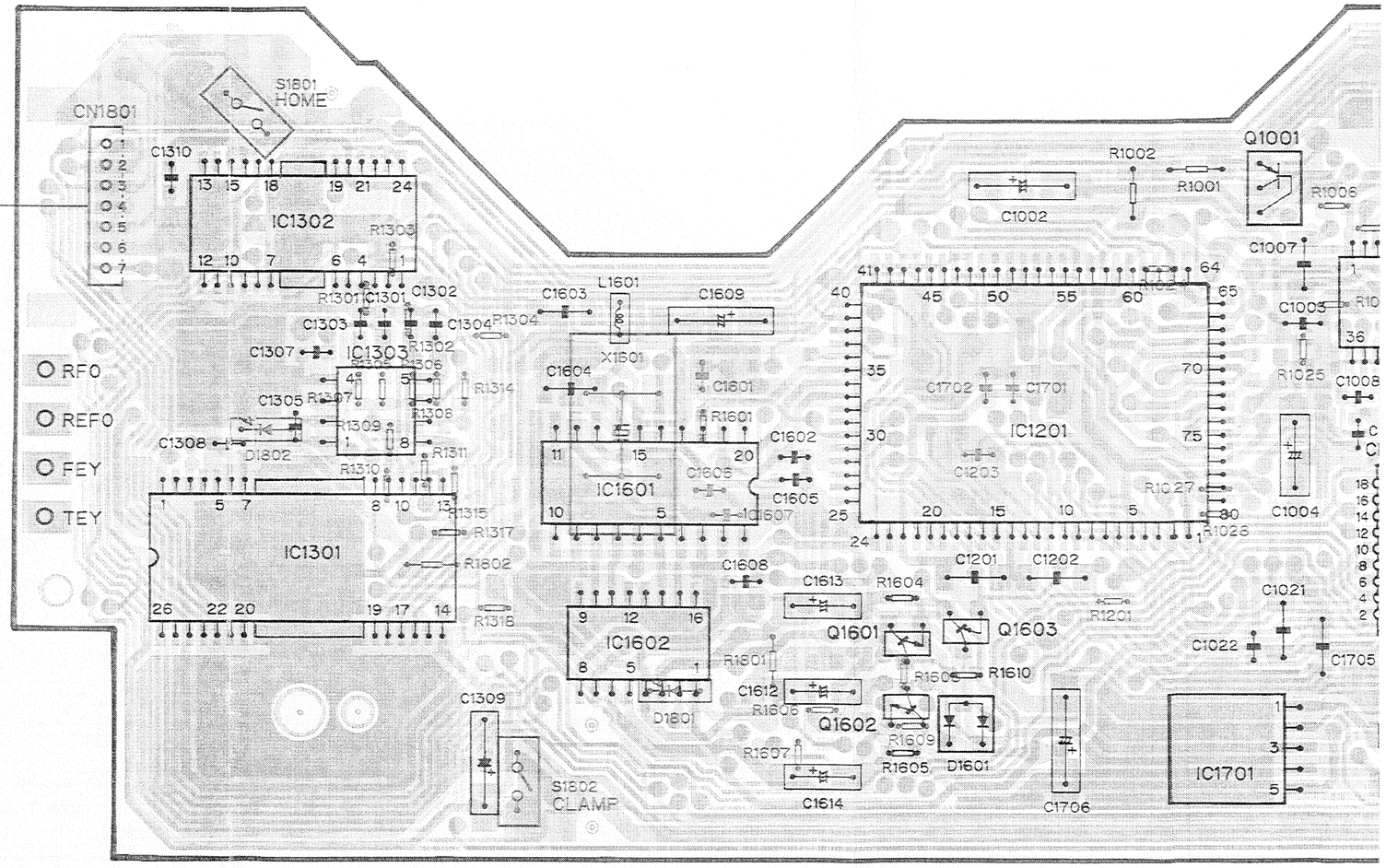


CONTROL UNIT CN1801

CONTROL UNIT

IC, Q IC1302 IC1301 IC1303 IC1601 IC1602 Q1601 Q1602 Q1603 IC1201 IC1701 Q1001

ADJ



TROL UNIT

IC1302
IC1301 IC1303

IC1601
IC1602

Q1601
Q1602 Q1603 IC1201

IC1701 Q1001

IC1001

VR1003 VR1002
VR1001 VR1004

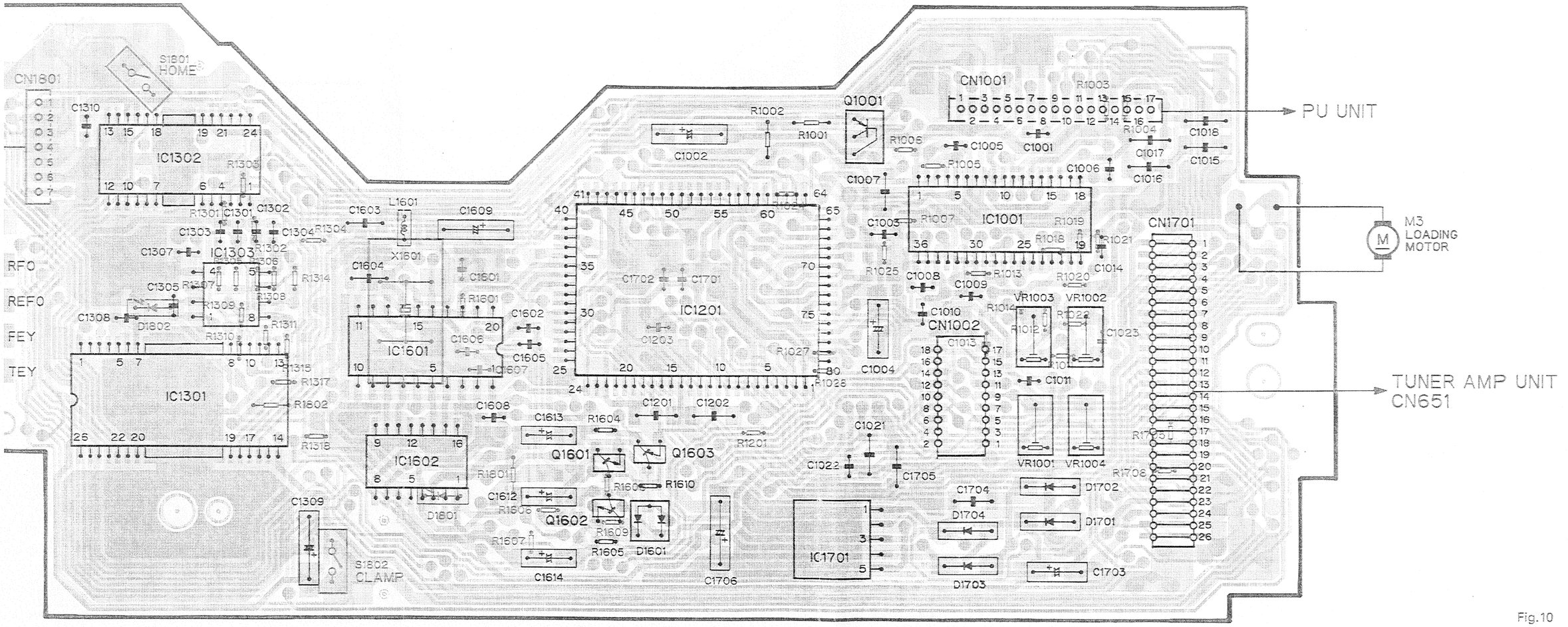
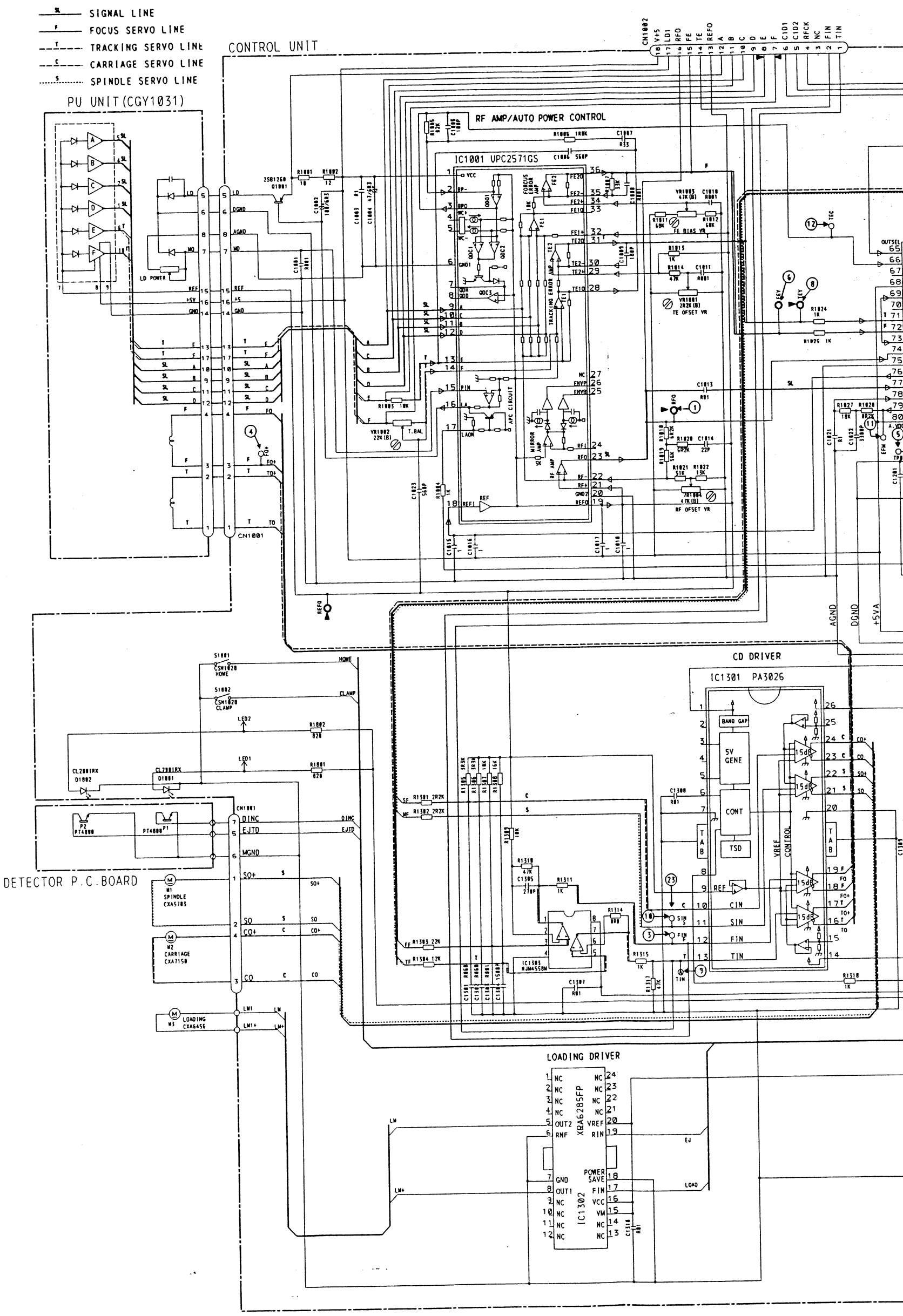


Fig.10

● Circuit Diagram



NOTE:

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

CN1002
18 V+5
17 LDI
16 RFO
15 FE
14 TE
13 REFO
12 A
11 B
10 C
9 D
8 E
7 F
6 C1D1
5 C1D2
4 RFCK
3 NC
2 FIN
1 TIN

POWER CONTROL

IC1201
UPD63700GF1
FOCUS/TRACKING
CARRIAGE/SPINDLE
DIGITAL SERVO
DIGITAL SIGNAL
PROCESSOR

D/A CONVERTER
IC1601 TC9268F

LOW-PASS FILTER
IC1602 TA2063F

CD DRIVER
IC1301 PA3026
BAND GAP
5V GENE
CONT
TSD
TAB
VREF CONTROL
REF
CIN
SIN
FIN
TIN
15dB

LOADING DRIVER
IC1302 XRA6285FP
VREF
RIN
POWER SAVE
FIN
VCC
VM

REGULATOR
IC1701 PQ05TZ51

AGND
DGND
+5VA
+5VD
+5V
GND
PGND
BVD
VD
VM
V+5
CONT
EJ
LOAD

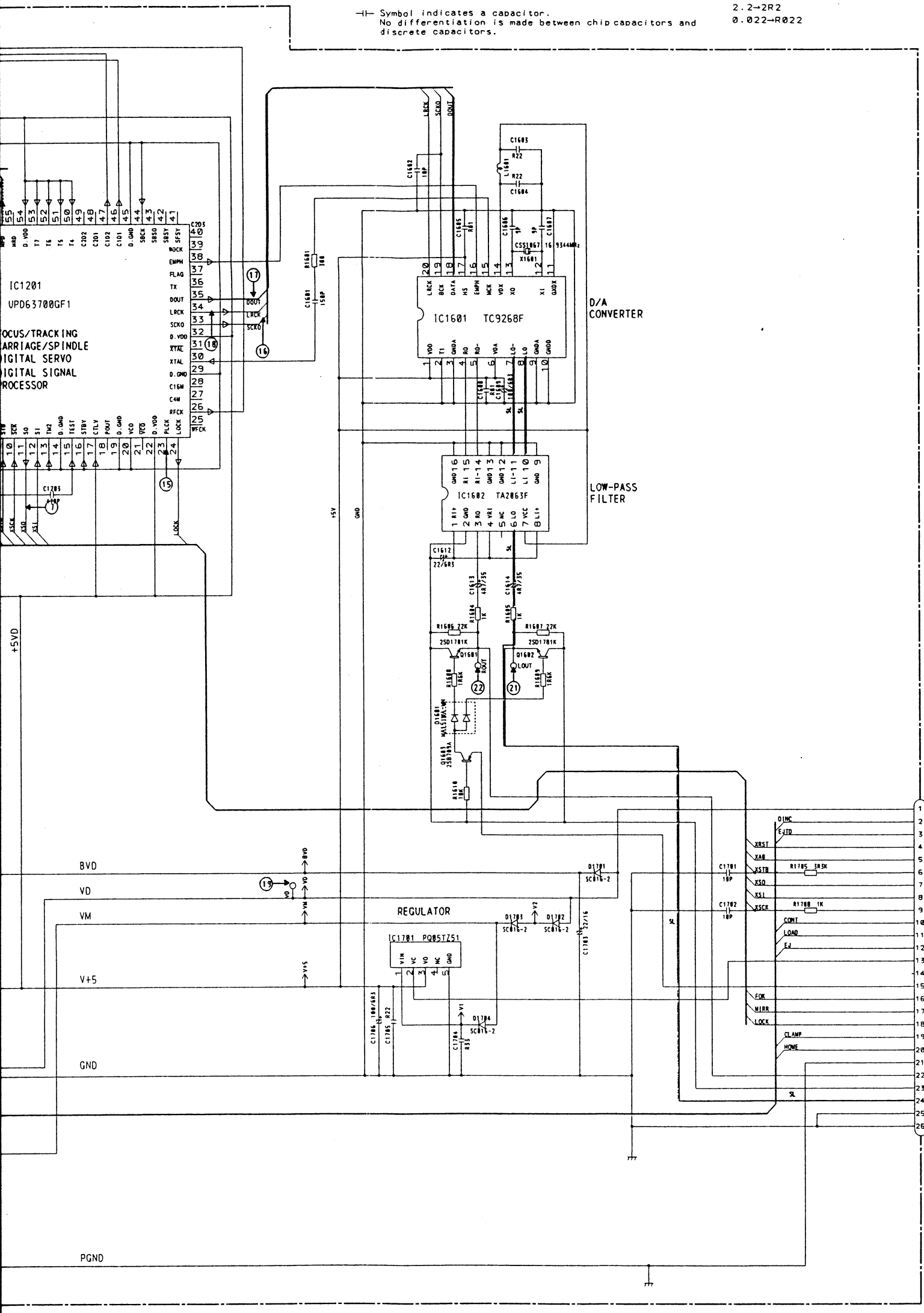
SWITCHES:
CONTROL UNIT
S1801:HOME SWITCH ..... ON-OFF
S1802:CLAMP SWITCH ..... ON-OFF
The underlined indicates the switch position.

NOTE:

⊏⊐ Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

⊣⊢ Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

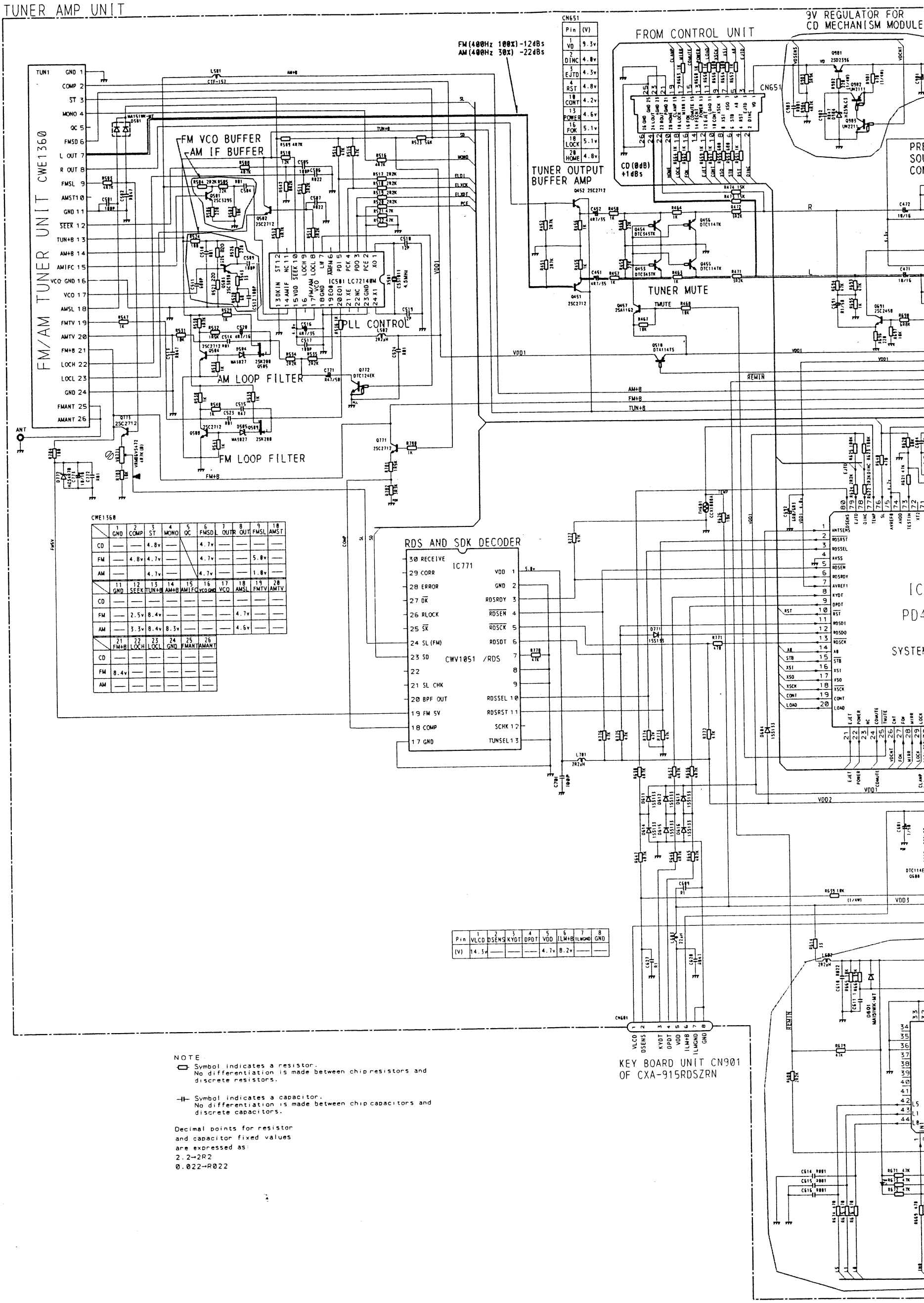


SWITCHES:
CONTROL UNIT
S1801:HOME SWITCH.....ON-OFF
S1802:CLAMP SWITCH.....ON-OFF
The underlined indicates the switch position.

Fig.11

8.3 TUNER AMP UNIT

● **Circuit Diagram**



CN651 Pin	(V)
1 VD	9.3v
2 DINC	4.8v
3 EJTD	4.3v
4 RST	4.8v
10 CONT	4.2v
13 POWER	4.6v
16 FOK	5.1v
18 LOCK	5.1v
20 HOME	4.8v

CWE1360

	1 GND	2 COMP	3 ST	4 MONO	5 QC	6 FMSD	7 OUTR	8 OUT	9 FMSL	10 AMST
CD	—	—	4.8v	—		4.7v	—	—	—	—
FM	—	4.8v	4.7v	—		4.7v	—	—	5.0v	—
AM	—		4.7v	—		4.7v	—	—	1.0v	—

	11 GND	12 SEEK	13 TUN+B	14 AM+B	15 AMIFC	16 VCO GND	17 VCO	18 AMSL	19 FMTV	20 AMTV
CD	—	—	—	—	—	—	—	—	—	—
FM	—	2.5v	8.4v	—	—	—	—	4.7v	—	—
AM	—	3.3v	8.4v	8.3v	—	—	—	4.6v	—	—

	21 FM+B	22 LOCH	23 LOCL	24 GND	25 FMANT	26 AMANT
CD	—	—	—	—	—	—
FM	8.4v	—	—	—	—	—
AM	—	—	—	—	—	—

Pin	1 VLCD	2 DSENS	3 KYDT	4 DPDT	5 VDD	6 ILM+B	7 ILMGND	8 GND
(V)	14.3v	—	—	—	4.7v	8.2v	—	—

NOTE

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

CN651	
Pin	(V)
1 VD	9.3v
2 DINC	4.8v
3 EJTD	4.3v
4 RST	4.8v
10 CONT	4.2v
13 POWER	4.6v
16 FOK	5.1v
18 LOCK	5.1v
20 HOME	4.8v

2dBs
2dBs

FROM CONTROL UNIT

9V REGULATOR FOR CD MECHANISM MODULE

CN651

CD (0dB) +1dBs

TUNER OUTPUT BUFFER AMP

TUNER MUTE

PRE AMP AND SOURCE LEVEL CONTROL

IC471 NJM4558L

ELECTRONIC VOLUME CONTROL

IC481 LC7538JMHS

CD +6.1dBs
FM +4.2dBs
AM -5.8dBs

BUFFER AMP

IC483 NJM4558MD

IC482 NJM4558MD

RR FR RL FL

POWER AMP

4ch IC551 PA3029B

CD -5.9dBs
FM -7.8dBs
AM -17.8dBs

IC601
PD4576B
SYSTEM CONTROL

IC602
PD4402B
REMOTE KEY CONTROL

KEY BOARD UNIT CN901
OF CXA-915RDSZRN

CN601							
1 VLCO	2 DSENS	3 KYDT	4 DPDT	5 VDD	6 ILM+B	7 ILMGND	8 GND
				4.7v	8.2v	——	——

PAJ001A

Pin	1 GND	2 VDD1	3 RSTIN	4 VDD2	5 BSENS	6 ASENS	7 RSTOUT
(V)	——	5.0v	1.8v	5.0v	——	——	4.8v
Pin	8 CT1	9 IN3	10 NC	11 MUTE	12 IN1	13 IN2	14 VCC
(V)	2.9v	4.3v		——	3.9v	4.4v	13.6v

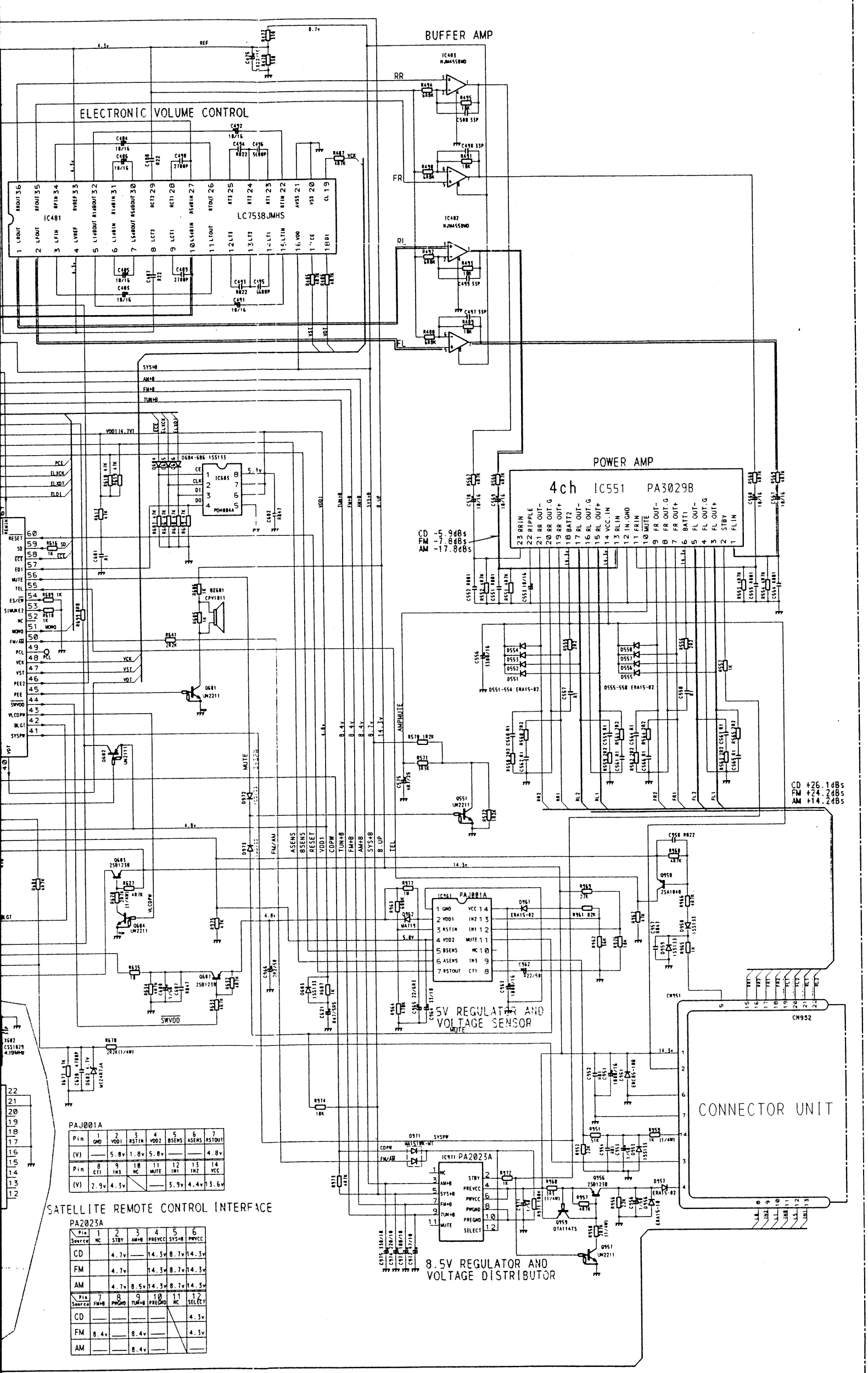
SATELLITE REMOTE CONTROL INTERFACE

PA2023A

Pin / Source	1 NC	2 STBY	3 AM+B	4 PREVCC	5 SYS+B	6 PWVCC
CD		4.7v	——	14.3v	8.7v	14.3v
FM		4.7v		14.3v	8.7v	14.3v
AM		4.7v	8.5v	14.3v	8.7v	14.3v
Pin / Source	7 FM+B	8 PWGND	9 TUN+B	10 PREGND	11 NC	12 SELECT
CD	——	——	——	——		4.3v
FM	8.4v	——	8.4v	——		4.3v
AM	——	——	8.4v	——		——

5V REGULATOR AND VOLTAGE SENSOR MUTE

8.5V REGULATOR AND VOLTAGE DISTRIBUTOR



PAJ001A							
Pin	1 GND	2 VDD1	3 RSTIN	4 VDD2	5 BSENS	6 ASENS	7 RSTOUT
(V)	——	5.0v	1.8v	5.0v	——	——	4.8v
Pin	8 CT1	9 IN3	10 NC	11 MUTE	12 IN1	13 IN2	14 VCC
(V)	2.9v	4.3v	\	——	3.9v	4.4v	13.6v

PA2023A						
Pin / Source	1 NC	2 STBY	3 AM+B	4 PREVCC	5 SYS+B	6 PWVCC
CD		4.7v	——	14.3v	8.7v	14.3v
FM		4.7v		14.3v	8.7v	14.3v
AM		4.7v	8.5v	14.3v	8.7v	14.3v
Pin / Source	7 FM+B	8 PWGND	9 TUN+B	10 PREGND	11 NC	12 SELECT
CD	——	——	——	——	\	4.3v
FM	8.4v	——	8.4v	——	\	4.3v
AM	——	——	8.4v	——	\	——

Fig.12

Connection Diagram

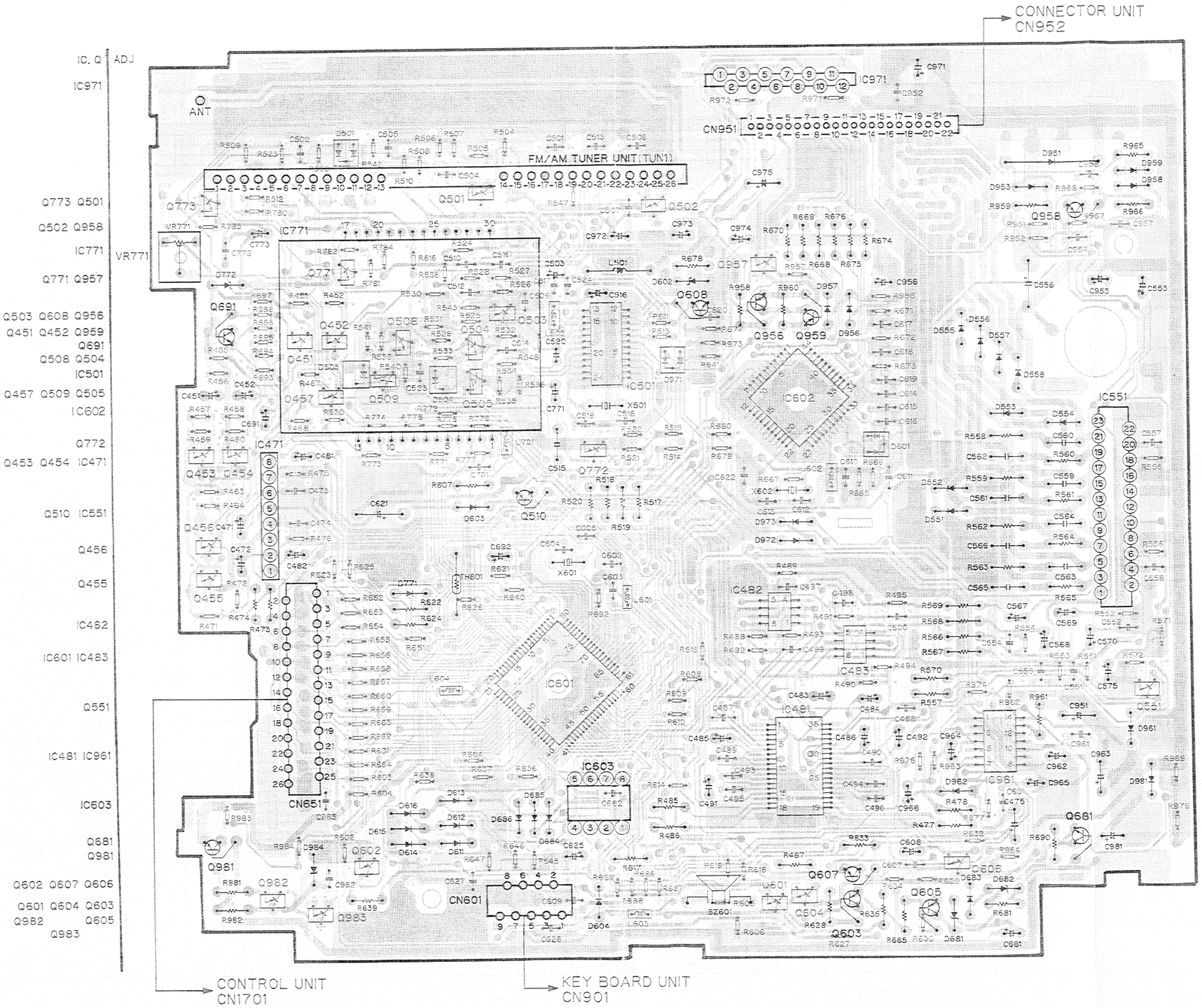


Fig.13

8.4 FM/AM TUNER UNIT

● **Circuit Diagram**

FM/AM TUNER UNIT

FM SIGNAL
MW/LW SIGNAL

FM FRONT END
MW/LW OSC
FM OSC
MW/LW DET
FM MPX
PNS
MW/LW RF
FM IF
PA2021B
PA2022B
TUNER AMP UNIT TUN1

NOTE:
Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

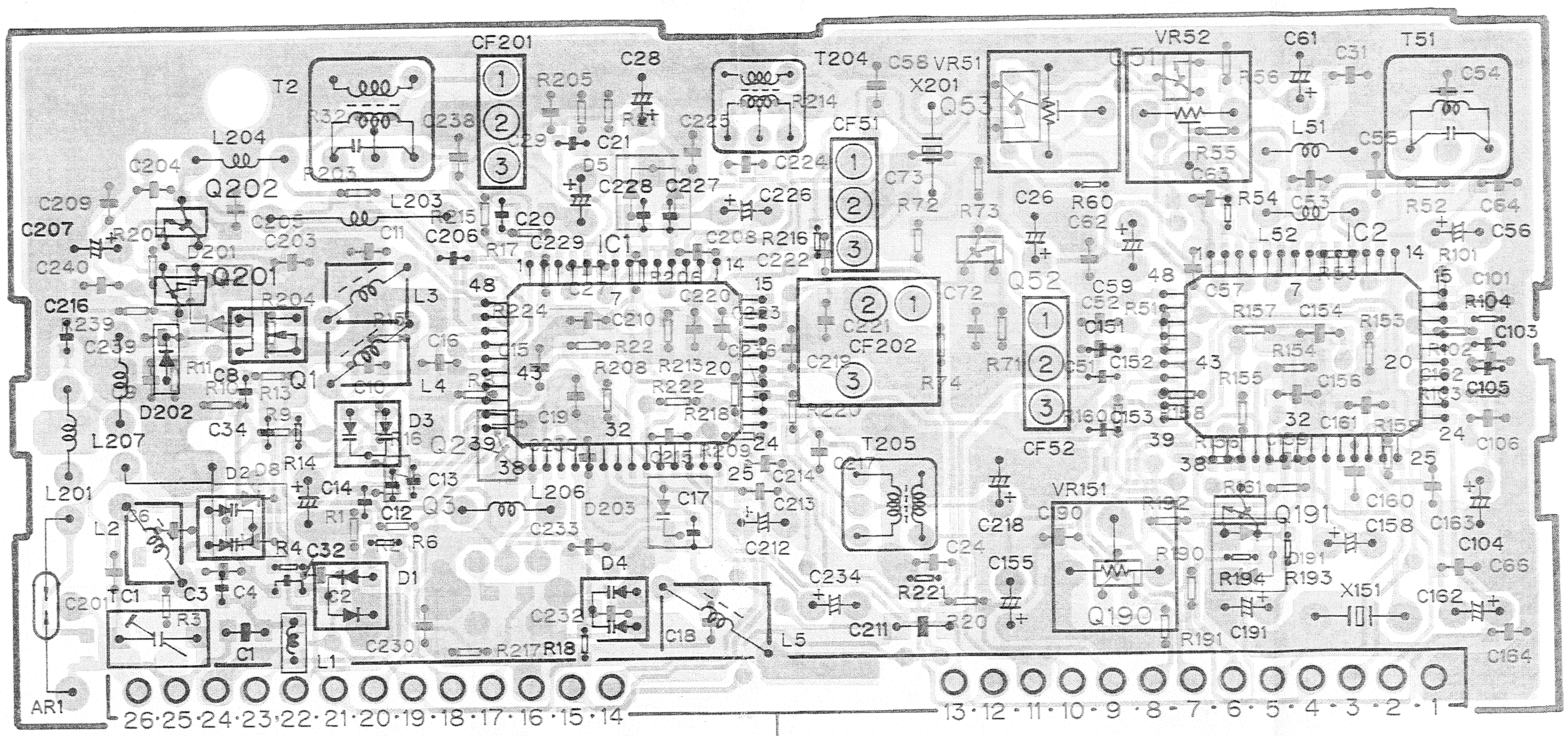
Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

Fig.14

● Connection Diagram

IC, Q	Q202 Q201	Q1	Q3	Q2	IC1	Q52	Q53	Q51 Q190	Q191	IC2

ADJ	TC1	L2	T2 L4	L5	T204	T205	VR51	VR151	VR52	T51



TUNER AMP UNIT
TUN 1

Fig.15

9. CD MECHANISM MODULE EXPLODED VIEW

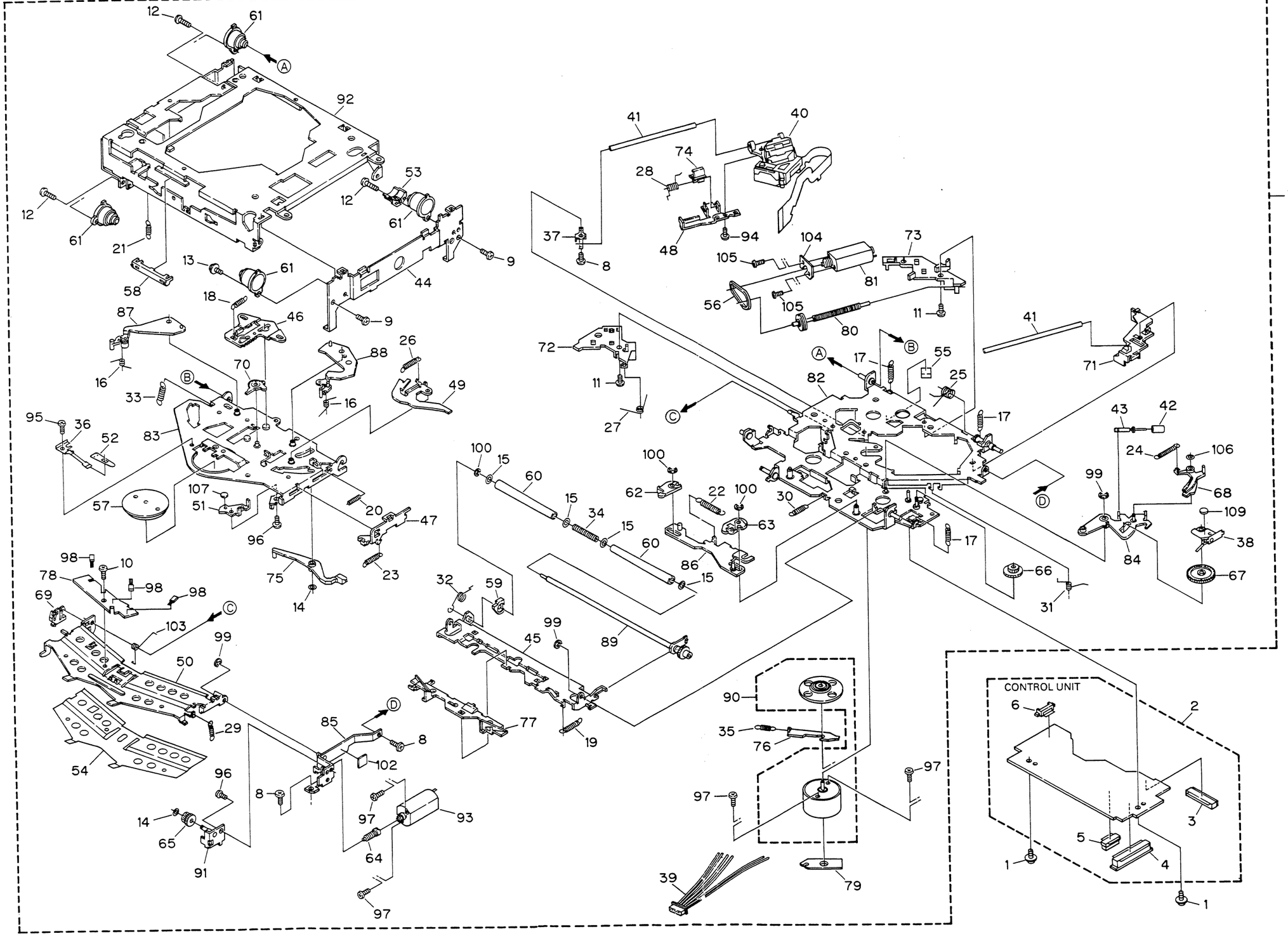


Fig.16

NOTE:

● Parts marked by "✱"are generally unavailable because they are not in our Master Spare Parts List.

● **Parts List**

Mark	No.	Description	Part No.
	1	Screw	PMS26P040FMC
	2	Control Unit	CWX1796
	3	Connector(CN1001)	CKS1955
	4	Connector(CN1701)	CKS2775
	5	Connector(CN1002)	CKS2811
	6	Connector(CN1801)	CKS2196
	7	CD Mechanism Unit	CXA7048
	8	Screw	BMZ20P030FMC
	9	Screw	BSZ20P040FMC
	10	Screw	CBA1250
	11	Screw	CBA1077
	12	Screw	CBA1230
	13	Screw	CBA1296
	14	Washer	CBF1038
	15	Washer	CBF1060
	16	Spring	CBH1415
	17	Spring	CBH1417
	18	Spring	CBH1418
	19	Spring	CBH1421
	20	Spring	CBH1423
	21	Spring	CBH1457
	22	Spring	CBH1552
	23	Spring	CBH1553
	24	Spring	CBH1554
	25	Spring	CBH1665
	26	Spring	CBH1556
	27	Spring	CBH1557
	28	Spring	CBH1558
	29	Spring	CBH1664
	30	Spring	CBH1560
	31	Spring	CBH1576
	32	Spring	CBH1577
	33	Spring	CBH1666
	34	Spring	CBH1583
	35	Spring	CBH1628
	36	Spring	CBL1170
	37	Spring	CBL1171
	38	Spring	CBL1200
	39	Connector	CDE4147
	40	PU Unit	CGY1031
	41	Shaft	CLA2220
	42	Roller	CLA2255
	43	Shaft	CLA2256
	44	Frame	CNC5661
	45	Arm	CNC5565
	46	Lever	CNC4891
	47	Lever	CNC4892
	48	Bracket	CNC4893
	49	Arm	CNC4895
	50	Arm	CNC5566
	51	Bracket	CNC5424
	52	Spacer	CNM3315
	53	Holder	CNV4018
	54	Sheet	CNM3693
	55	Bracket	CNM3917
	56	Belt	CNT1053
	57	Clamper Unit	CXA6999
	58	Guide	CNV2891
	59	Holder	CNV3276
✱	60	Roller	CNV3412
	61	Damper	CNV3974
	62	Arm	CNV3565
	63	Arm	CNV3992
	64	Gear	CNV3567
	65	Gear	CNV3568
	66	Gear	CNV3569
	67	Gear	CNV3570
	68	Arm	CNV3571
	69	Holder	CNV3572
	70	Gear	CNV3573
	71	Holder	CNV3574
	72	Holder	CNV4067
	73	Holder	CNV3576
	74	Rack	CNV3577
	75	Arm	CNV3578
	76	Plate	CNV3629
	77	Guide	CNV3694
✱	78	Gathering P.C.Board	CNX2103
	79	Gathering P.C.Board	CNX2128
	80	Screw Unit	CXA2375
	81	Motor Unit	CXA7150
	82	Chassis Unit	CXA6979
	83	Arm Unit	CXA5603
	84	Arm Unit	CXA5604
	85	Bracket Unit	CXA5605
	86	Lever Unit	CXA6975
	87	Arm Unit	CXA5607
	88	Arm Unit	CXA5608
	89	Gear Unit	CXA6976
	90	Motor Unit	CXA5703

Mark	No.	Description	Part No.
	91	Bracket Unit	CXA5938
	92	Frame Unit	CXA6192
	93	Motor Unit	CXA6456
	94	Screw	JFZ17P035FNI
	95	Screw	JFZ20P014FMC
	96	Screw	JFZ20P020FZK
	97	Screw	JFZ20P025FMC
	98	Photo-transistor	PT4800
	99	Washer	YE15FUC
	100	Washer	YE20FUC
	101	•••••	
	102	Sheet	CNM4028
	103	Spring	CBH1710
	104	Spacer	CNC5436
	105	Screw	JFZ20P045FMC
	106	Washer	CBF1061
	107	Cushion	CNM4089
	108	Bracket	CNM3917
	109	Cushion	CXX1136

10. CHASSIS EXPLODED VIEW

● **Parts List**

Mark	No.	Description	Part No.
	1	Screw	BMZ26P050FMC
	2	Screw	BMZ26P050FZK
	3	Screw	BMZ26P080FMC
	4	Screw	BMZ30P050FMC
	5	Screw	BMZ30P120FMC
	6	Screw	CBA1324
	7	Case	CNB1791
	8	Earth Plate	CNC5130
	9	•••••	
	10	Spacer	CNM3908
	11	Insulator	CNM4230
	12	Insulator	CNM3894
	13	•••••	
	14	P.C.Board	CNP3534
	15	Bush	CNV3253
*	16	Clamper	CNV3954
	17	Tuner Amp Unit	CWX1817
	18	Chassis Unit	CXA7277
	19	CD Mechanism Module	CXK2814
	20	Screw	BMZ26P120FMC
	21	Screw	BMZ30P050FMC
	22	Connector(CN601)	CKS1529
	23	Connector(CN651)	CKS1546
	24	Spacer	CNM4367
	25	Holder	CNC5529
	26	Holder	CNC5013
	27	Bracket	CNC5146
	28	Insulator	CNM4383
	29	Fuse(FU901)	CEK1136
	30	Heat Sink	CNR1307
	31	FM/AM Tuner Unit	CWE1360
	32	Connector Unit	CWX1879
	33	Holder Unit	CXA7230
	34	Screw	BPZ20P060FMC
	35	Spring	CBH1659
	36	Socket	CKS2782
	37	Holder	CNC4943
	38	Holder	CNC4944
	39	P.C.Board	CNP3532
	40	Arm	CNV3696
	41	Arm	CNV3697
	42	Detach Mechanism Unit	CXA7300
	43	Panel Unit	CXA7236
	44	Screw	PMS20P030FZK
	45	Connector(CN953)	CKM1088
	46	Connector(CN952)	CKS2905
	47	Holder	CNC5144
	48	Washer	CBF1039
	49	Spring	CBH1484
	50	Arm	CNV3292
	51	Arm	CNV3293
	52	Holder Unit	CXA5124
	53	•••••	
	54	Holder	CNC5803
	55	IC(IC971)	PA2023A
	56	Transistor(Q981)	2SD2396
	57	IC(IC551)	PA3029B
	58	Insulator	CNM4077

● **Chassis**

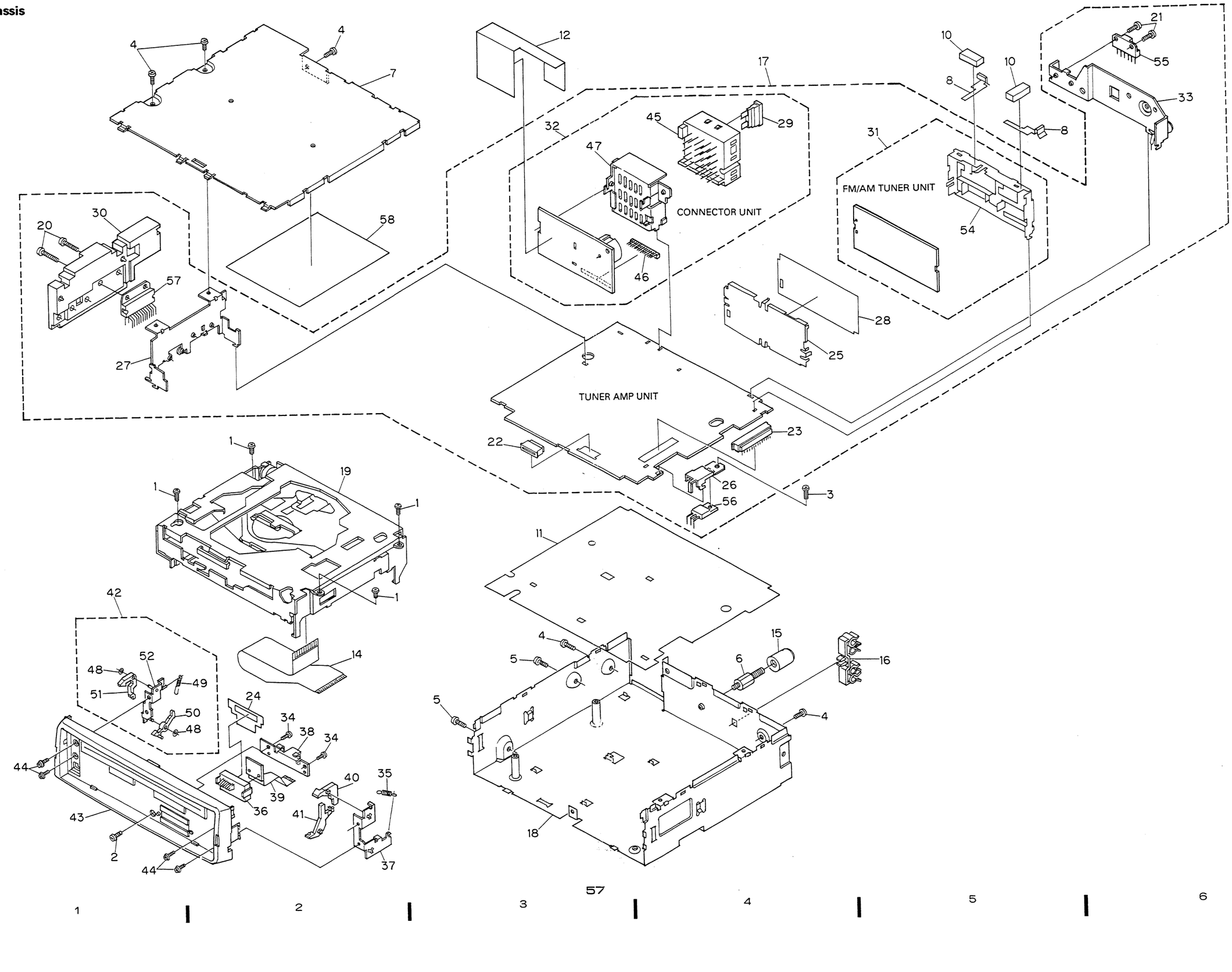


Fig.17

11. BLOCK DIAGRAM

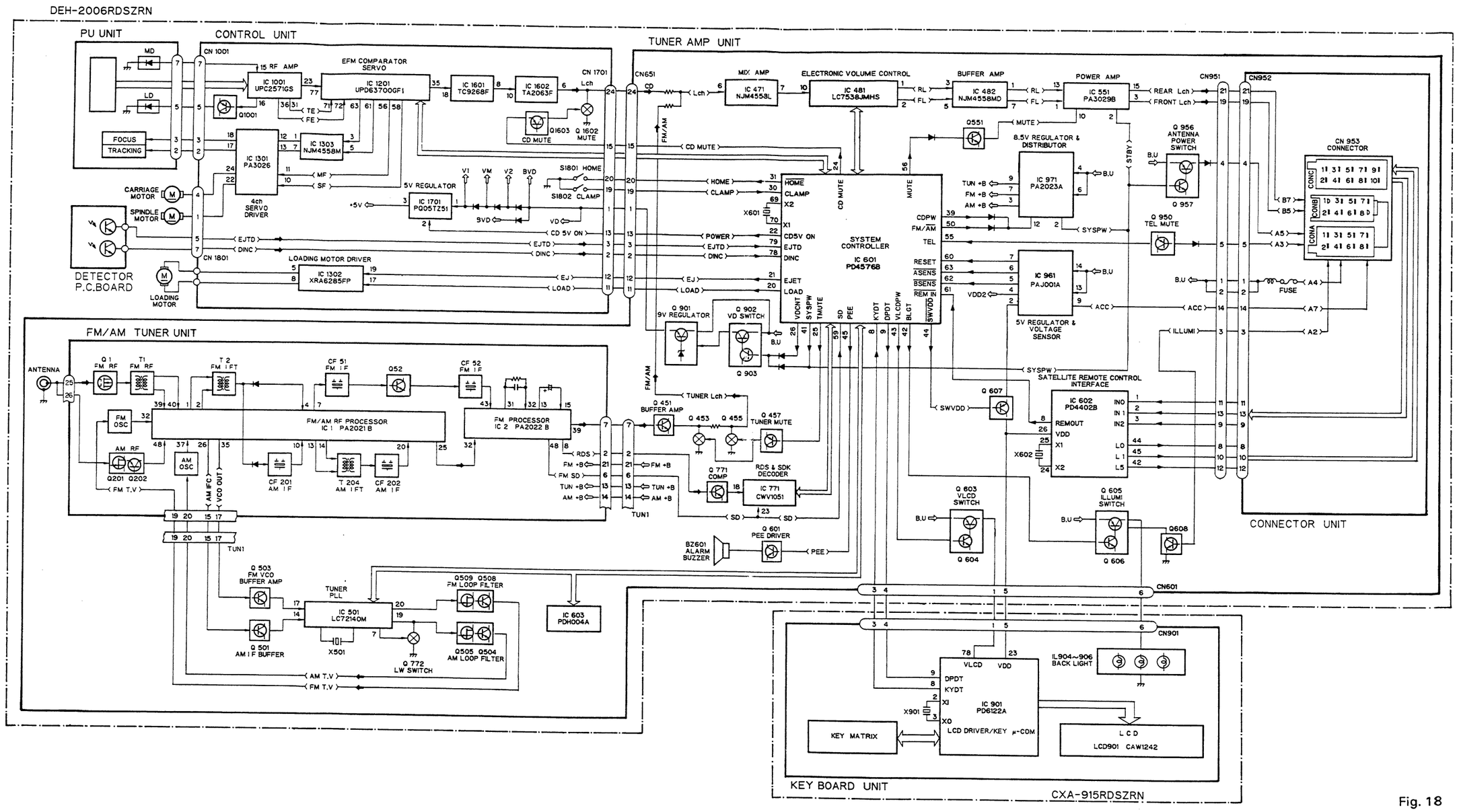


Fig. 18

12. PACKING METHOD

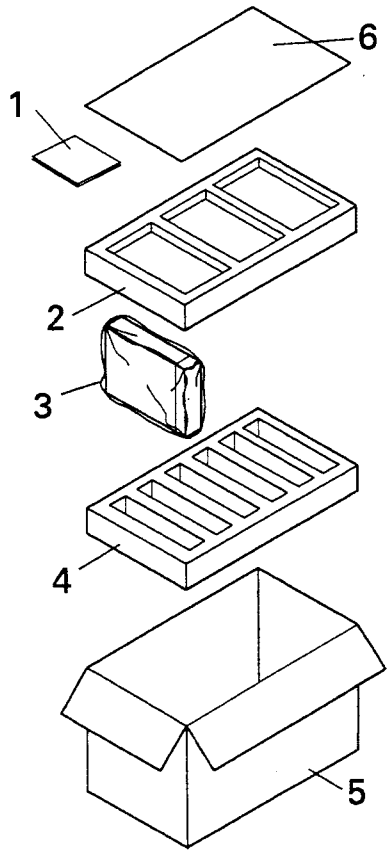


Fig.19

● **Parts List(DEH-2006RDSZRN/EW)**

Mark	No.	Description	Part No.
	1	Owner's Manual	CRD1889
	2	Protector	CHP1619
	3	Polyethylene Bag	CEG-162
	4	Protector	CHP1620
	5	Contain Box	CHL2612
	6	Paper Sheet	CHW1442

● The DEH-2006ZRN/X1B/EW Parts List enumerates the parts which differ from those for the DEH-2006RDSZRN/EW only. The parts other than those enumerated in the DEH-2006ZRN/X1B/EW Parts List are identical with those in the DEH-2006RDSZRN/EW Parts List, to which you are requested to refer, accordingly.

Mark No.	Description	DEH-2006RDSZRN/EW Part No.	DEH-2006ZRN/X1B/EW Part No.
2	Protector	CHP1619	UHP-011
3	Polyethylene Bag	CEG-162	UEG-002
4	Protector	CHP1620	UHP-010
5	Contain Box	CHL2612	UHD-014

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PIONEER®
The Art of Entertainment

Service Manual

ORDER NO.
CRT1574

CD MECHANISM MODULE

CX-540

- **This service manual describes operation of the CD mechanism incroporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model	Service Manual	CD Mechanism Module	CD Mechanism Unit
DEH-605RDS/EW,X1B/EW	CRT1563	CXK2810	CXA6475
DEH-505SDK/GR			
DEH-505/EW,X1B/EW			
DEH-405SDK/GR			
DEH-505/UC	CRT1570	CXK2800	CXA5970
DEH-503/ES			
DEH-45/UC			
DEH-405/UC			
DEH-305/US			
DEH-303/ES			
DEH-205/UC			
DEH-203/ES			

CONTENTS

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PIONEER ELECTRONICS OF CANADA, INC. 300 Allstate Parkway Markham, Ontario L3R 0P2 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY.LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL:[03]580-9911

K-FFK.FEB. 1994 Printed in Japan

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1. CIRCUIT DESCRIPTION

1.1 PRE-AMPLIFIER STAGE (IC1001 UPC2571GS)

The optical signals are converted to voltage signals using an i/v amplifier inside the PU unit.
These voltage signals (A - F) are further processed by this pre-amp stage.
The pre-amplifier performs the following tasks

> Automatic power control of the PU unit's laser diode.
> Generation of an equalized RF signal from the photo-detector outputs (A - D).
> Generation of a focus error signal from the photo-detector outputs (A - D).
> Generation of a tracking error signal from the photo-detector outputs (E & F).
> Generation of a tracking zero crossing signal from the photo-detector outputs (E & F).

This IC runs from a single voltage supply (+5V). The reference voltage for this IC, the PU unit, and all the servo circuitry is REFO. This is obtained from pin 19 of the pre-amp ; which in turn is derived from the output REFOUT of the servo LSI, IC1201, UPD63700GF. The voltages REFOUT and REFO should be at +2.5V DC with respect to GND. All measurements and observations should be made using REFO as the reference as this is a buffered output. Care should be taken not to inadvertently short REFO to GND.

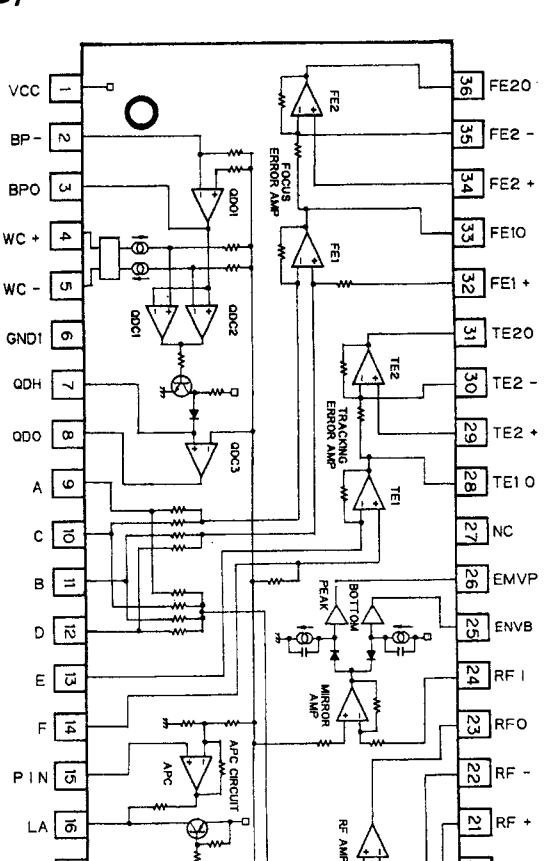


Fig.1 : UPC2571GS BLOCK DIAGRAM

1) Automatic Power Control (APC)

The laser diode's junction voltage varies greatly with temperature ; causing large output variations in optical power. To avoid this, a monitor diode is used in a feedback circuit to keep the optical power constant. As two different manufacturer's laser diodes are used the LD current falls into two broad bands : approx. 40mA and approx. 60mA.

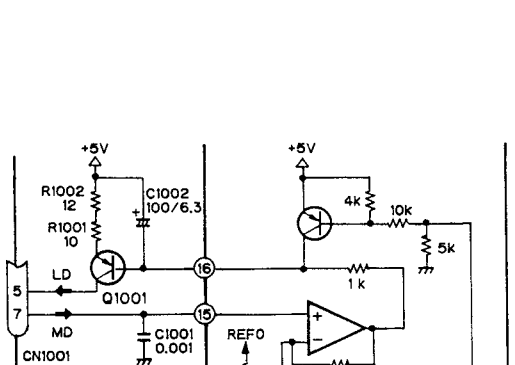


Fig.2 : APC CIRCUIT

2) RF Amplifier

This performs a simple summation of the photo-detector outputs A,B,C & D, amplifies, and equalizes to produce the RF signal at RFO. The RF eye pattern may be monitored here. The RFO OFFSET volume is used to ensure that the RFO waveform has the correct offset relative to the FOK threshold level inside the servo LSI UPD63700GF. The FOK signal is used in the focus close sequence, and during play to control the defect circuit inside the UPD63700GF.

The AC coupled RFO signal, RFI, is used by the UPD63700GF to generate the EFM signal which is used in turn by the DSP spindle CLV control sections.

For low frequency signals :

VRFO = (A+B+C+D) x (R1018+R1019)/10k = (A+B+C+D) x 6.22

The RFO waveform should have an amplitude of approx. 1.9Vpp, with it's upper envelope at +1.1V DC w.r.t. REFO.

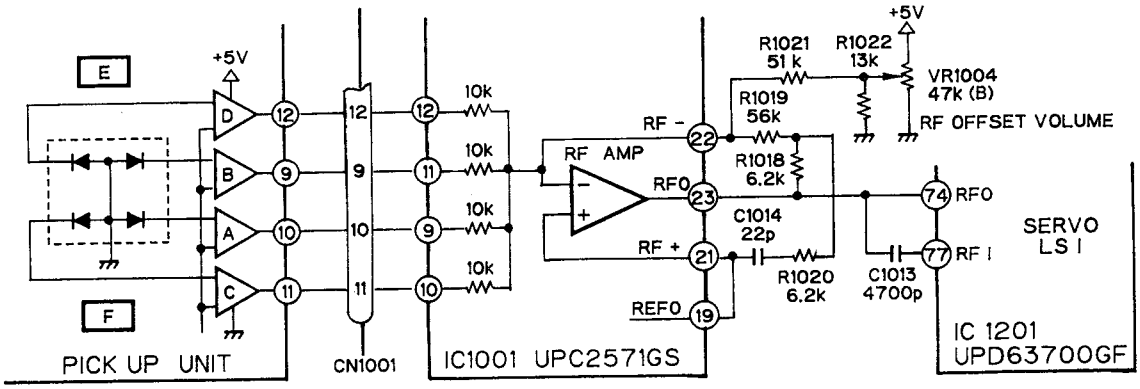


Fig.3 : RFO AMPLIFIER

3) Focus Error Amplifier

This produces a focus error signal used as the basis for the focus servo.

VFEY = ((A+C)-(B+D)) x 5 x (R1007//20k)/10k

= FE x 6.23 (FE = PU unit focus error)

The S-Curve at FEY should have an amplitude of approx. 1.9Vpp.

The second amplifier stage is also a low pass filter, fc=11kHz, and has a bias volume adjustment. This adjustment is used to vary the reference bias level of the focus servo loop and is adjusted to obtain an optimum eye pattern at RFO.

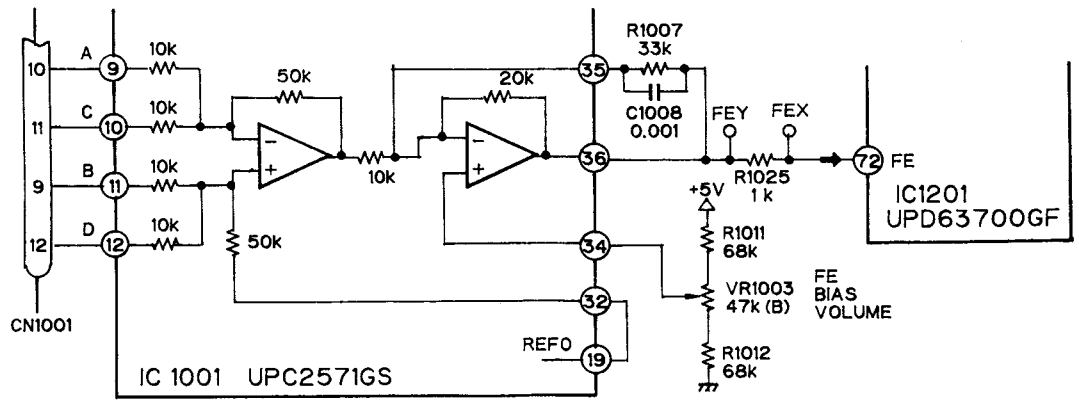


Fig.4 : FOCUS ERROR AMPLIFIER

4) Tracking Error Amplifier

This produces the tracking error signal used in the tracking servo loop.

VTEY = (25 x E) - (25 x F x 2 x 10k / (T.BAL+10k))

Normally, the sensitivity of E & F are the same and T.BAL=10k

=> VTEY = 25 x (E-F)

If, however, the E and F sensitivities are different the T.BAL volume can be used to cancel out the unbalance. The offset adjustment TE OFFSET is to cancel any DC offsets from the photo-detectors or op-amps to ensure the reference bias for the servo loop is at zero. Maladjustment of either of these pre-sets will result in poor tracking performance and susceptibility to skipping.

For a typical unit, the TEY level should be approx. 1.8 Vpp.

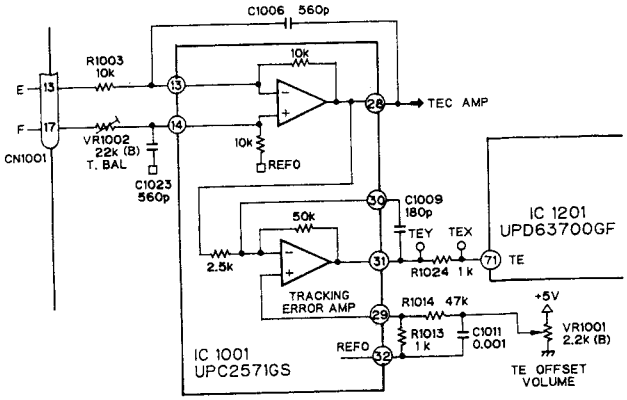


Fig.5 : TRACKING ERROR AMPLIFIER

5) Tracking Zero Crossing Amplifier

TEC1 is basically an amplified, AC coupled, version of the TEY waveform. It is used by the servo LSI IC1201, UPD63700GF to located the zero crossing points of the TEY signal to :

1) Determine how many tracks have been crossed during track jumping or a carriage move operation.
2) Determine in which direction the lens is moving when attempting to close tracking. This is used in the "tracking brake" circuit described later.

For signals in the range 500Hz - 5kHz :

VTEC1 = R1005/R1006 x (E-F) = 45.5 x (E-F)

Typically TEC1 is around 4.2Vpp, this means that the TEC1 signal level may be greater than the saturation limit of the op-amp and the signal will clip. However, since the servo LSI only uses the zero-crossing points, this is not critical.

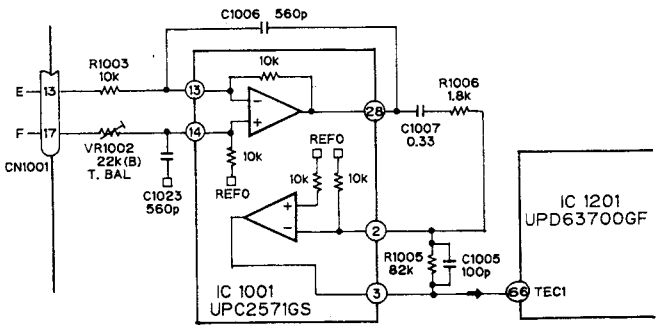


Fig.6 : TRACKING ZERO CROSSING AMPLIFIER

1.2 SERVO STAGE (UPD63700GF)

All the servo equalization & sequencing, such as focus closing, track jumping, carriage moving etc. are performed in this LSI, as well as all the DSP functions : data decoding, error protection, interpolation etc. The signals FE & TE are digitized and processed by the servo block to produce the focus, tracking & carriage drive signals, in a PWM format.

The RFI signal is converted to the EFM signal which is decoded by the DSP block to produce an audio signal ; during this process, a spindle servo error signal is also generated and used by the servo block to produce a spindle drive signal, again in PWM form.
The PWM waveforms are filtered, to remove the PWM carrier, amplified by the driver IC1301 PA3026, and output to the corresponding actuators.

1) Focus Servo System

The main focus equalization takes place inside the UPD63700GF (figure 7). The equalizer response can be measured between FEX and FIN and has the shape shown in figure 8.

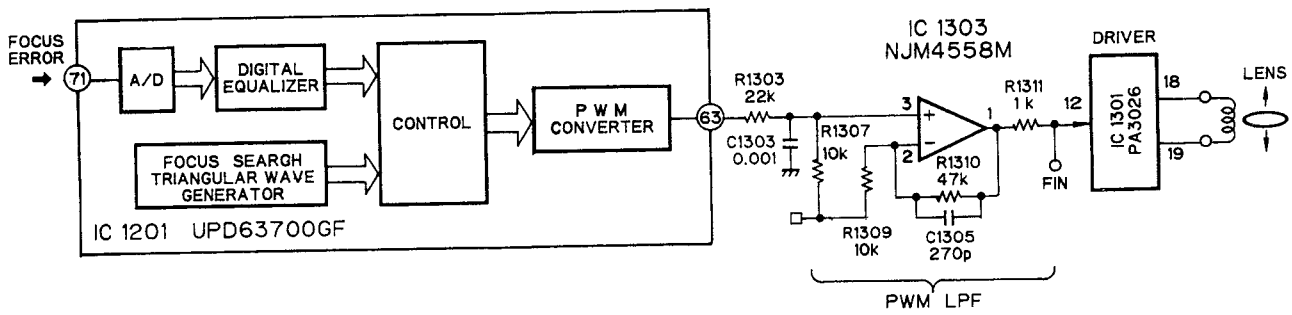


Fig.7 : FOCUS SERVO BLOCK DIAGRAM

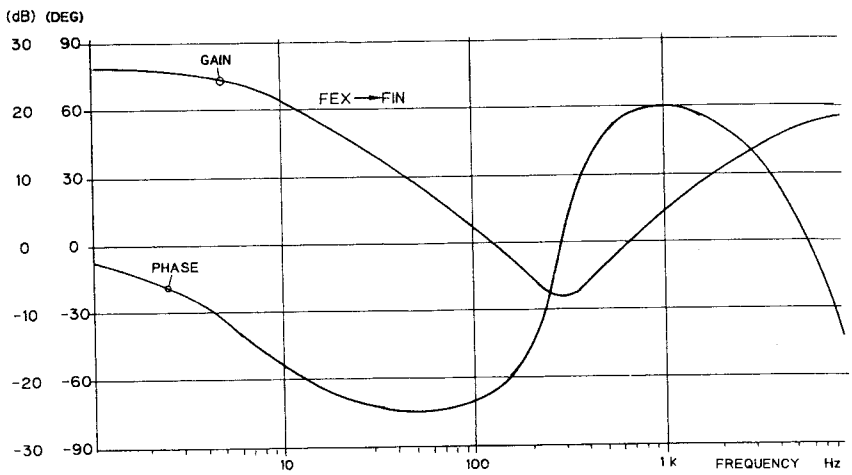


Fig.8 : FOCUS EQUALIZER

In order to smoothly close focus the lens must first be within approx. 5μm of the "just focused" position. This position is achieved by a focus search sequence. The lens is moved up and down using a triangular wave search voltage while the spindle motor is kicked and kept rotating at an appropriate speed. The servo LSI monitors the FE and RFO signals and, at an appropriate point, automatically closes focus.

The conditions for focus close are :

1) The lens is moving from a far to a near position relative to the disc,
2) FOK = HIGH (5V),
3) FZD (IC internal signal) was latched high and
4) FE = 0 (w.r.t. REFO).

When the focus servo closes, the servo LSI's serial data output port, XSO, will show a high-low transition. This is received by the microcomputer as an indication that the servo loop was closed and after about 25mS it begins monitoring the FOK output, via a LPF, to verify that focus is still closed ; in the event of FOK becoming low for an appreciable time, the microcomputer will take appropriate action.

The various signal levels which contribute to focus close are shown in figure 9, which shows the case where focus close has been inhibited.

In TEST MODE, using FOCUS CLOSE MODE 1, conditions 2 & 3 can be inhibited to allow the S-Curve, focus search voltage and the actual lens movement to be observed at ease.

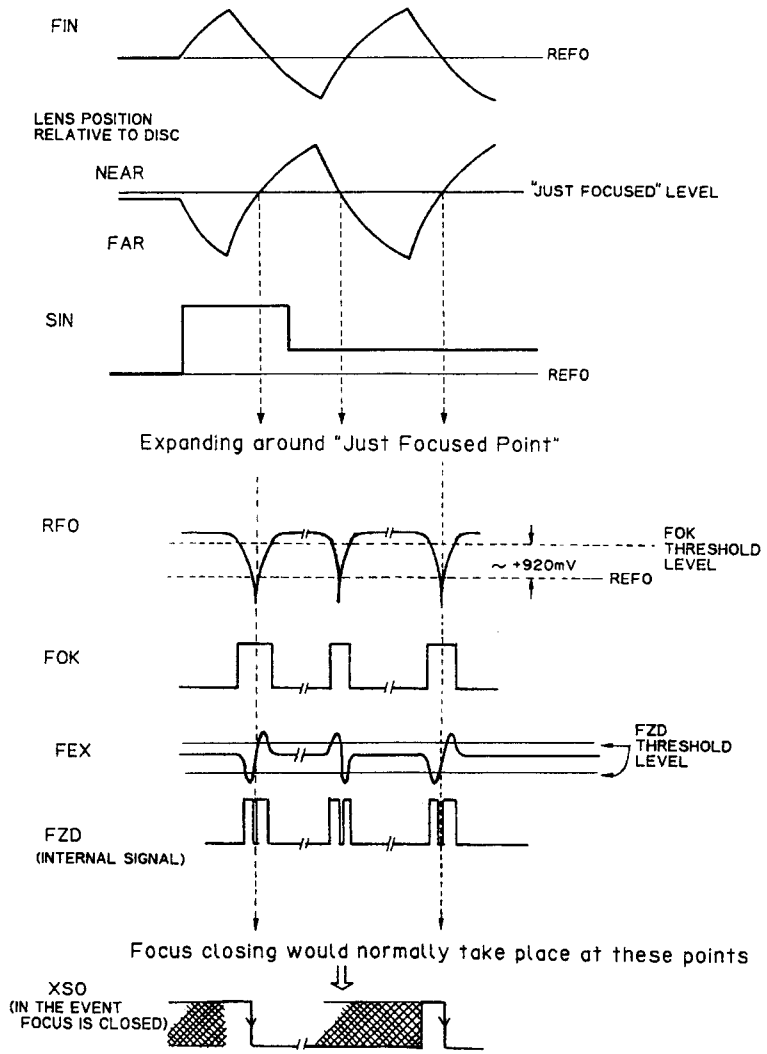


Fig.9 : FOCUS CLOSING SEQUENCE

a) FOK CIRCUIT

The FOK circuit inside the servo LSI compares the lower envelope of the RFO signal with a threshold level fixed by the microcomputer. Should the envelope level fall below this FOK level then FOK becomes high. This is used during focus close as stated and also during play to control a defect circuit, which switches the focus & tracking servos into a hold mode should the RFO envelope become disrupted by dirt, grease etc, thus increasing the player's defect response (figure 10).

The FOK threshold is approx. +920mV w.r.t. REFO. It is for this reason that the upper envelope should be adjusted to +1.1V DC w.r.t. REFO.

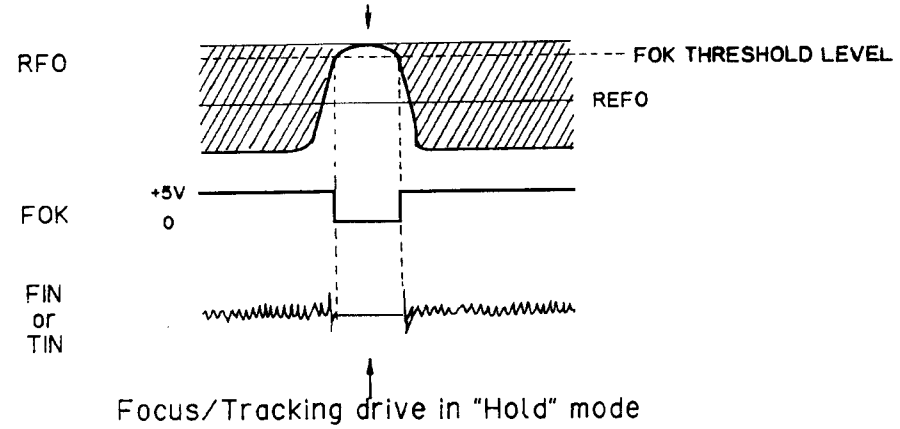


Fig.10 : DEFECT CIRCUIT

b) FZD CIRCUIT

The FZD circuit inside the servo IC compares the absolute value of the FE signal to a threshold value and outputs a high/low signal which is then used in the focus close sequence as stated.

At power on, the microcomputer switches the laser diode off and reads the value of the FE bias via the servo LSI's A/D port. The FZD threshold is set 200mV above this bias level.

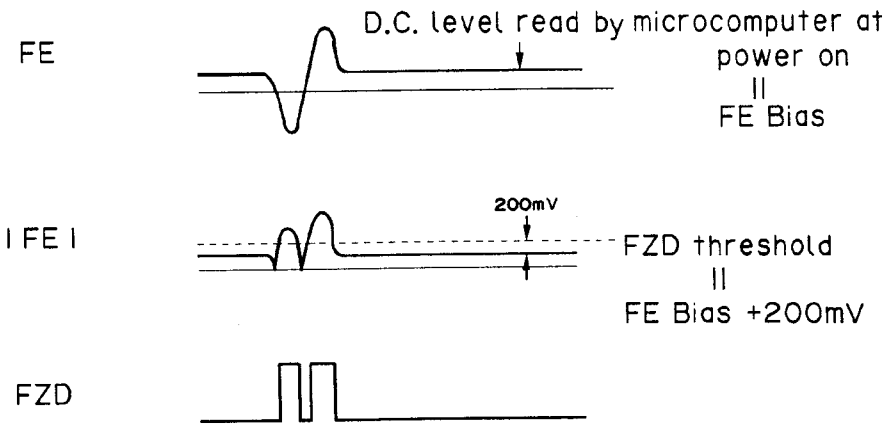


Fig.11 : FZD CIRCUIT

2) Tracking Servo System

The main tracking equalization takes place inside the UPD63700GF (figure 12). The equalizer response can be measured between TEX and TIN and will have the shape shown in figure 13.

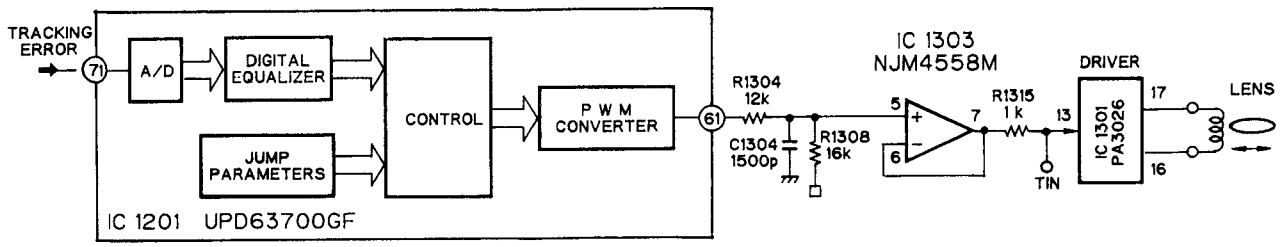


Fig.12 : TRACKING SERVO BLOCK DIAGRAM

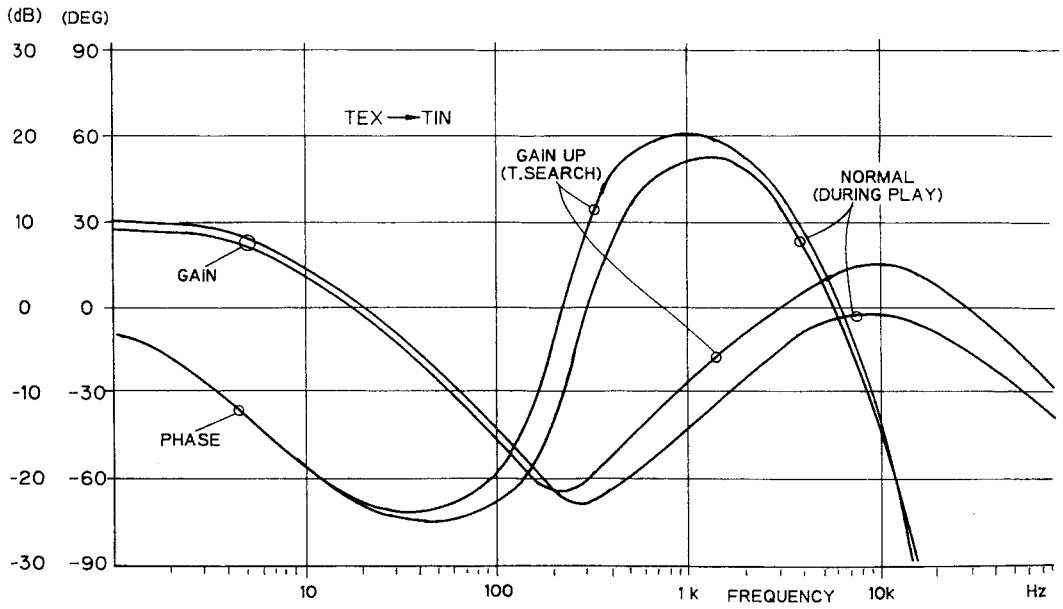


Fig.13 : TRACKING EQUALIZER

a) Track Jumping

Track jumping is performed automatically by the servo LSI upon receipt of the appropriate command from the microcomputer. The present microcomputer is programmed to use 1,4,10 & 32 track jump commands to achieve searching. The 32 track jump command may be used in pairs (64 tracks) or triplets (100 track) as required. In TEST MODE the 1,4,10,32 & 100 track jump and carriage move sequences may be observed by selecting the appropriate mode.

Note that the number of tracks jumped is controlled by setting an internal counter to half the total value and then counting this down using the zero crossing edges of TEC1. Once the counter is at zero, a brake pulse of fixed duration is output to bring the lens to a halt; allowing tracking to be closed and normal play to continue.

For a fixed period of time after a multi-track jump has been performed, a "tracking brake" circuit is activated in conjunction with a "gain-up" equalizer to ensure that the servo achieves stabilization before entering normal play.

Manual track search, in normal mode, uses a group of single track jumps to achieve FWD/REV at approx. ten times normal play speed.

The figures 14 & 15 show the timing charts for the single and multiple jump commands.

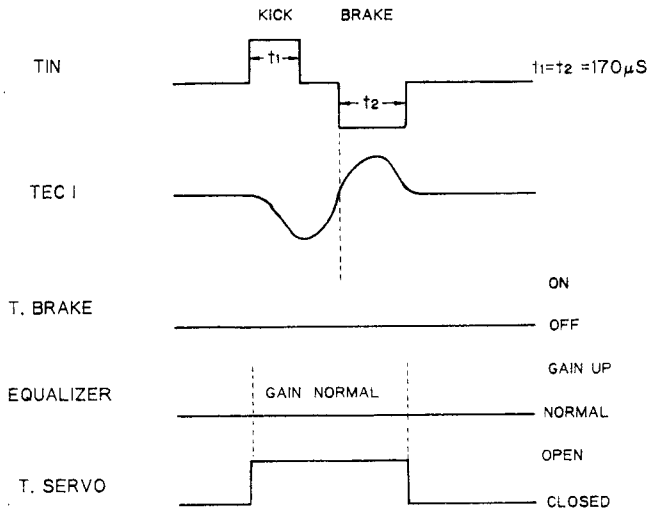


Fig.14 : SINGLE TRACK JUMP

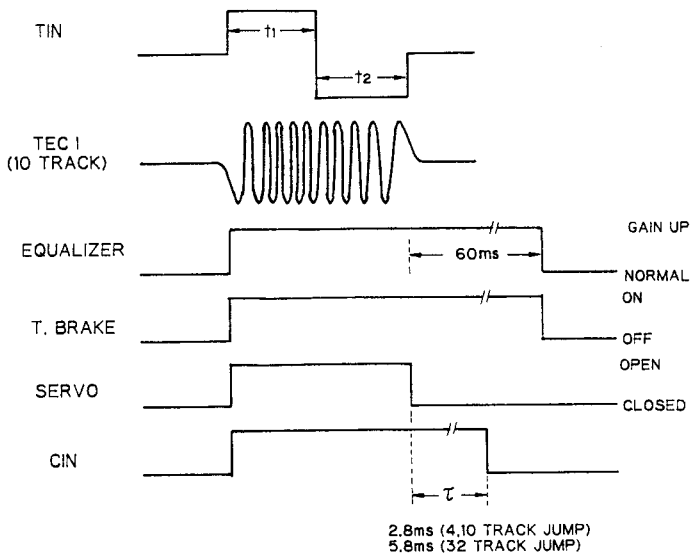
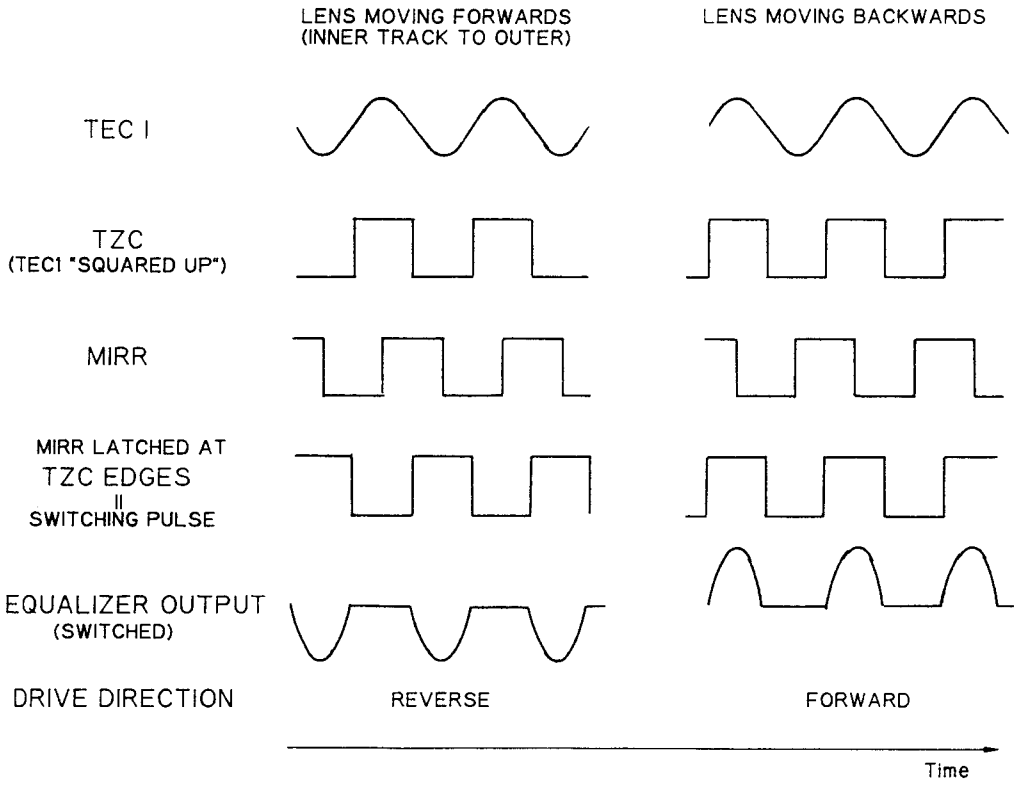


Fig.15 : MULTI TRACK JUMP

b) Tracking Brake Circuit (Figure 16)

This relies on determining which direction the lens is moving and only outputting the portion of the drive waveform which acts to oppose this motion. Direction of motion is deduced from TEC1 and the MIRR signal and knowledge of their phase relation.



Note : Equalizer output assumed to have same phase as TEC1.

Fig.16 : TRACKING BRAKE CIRCUIT

c) MIRROR Circuit

The MIRR circuit indicates if the laser beam is on or off track.

MIRR = 'H' => off track, MIRR = 'L' => on track.

MIRR is generated by detecting the upper and lower envelopes of the RFO waveform and producing a difference signal which is then compared with a peak-held version of itself to determine if the envelope size has dropped below a certain percentage.

If so, this is assumed to be due to the beam going off-track ; in practice dirt on the disc can also give the same effect (see figure 17).

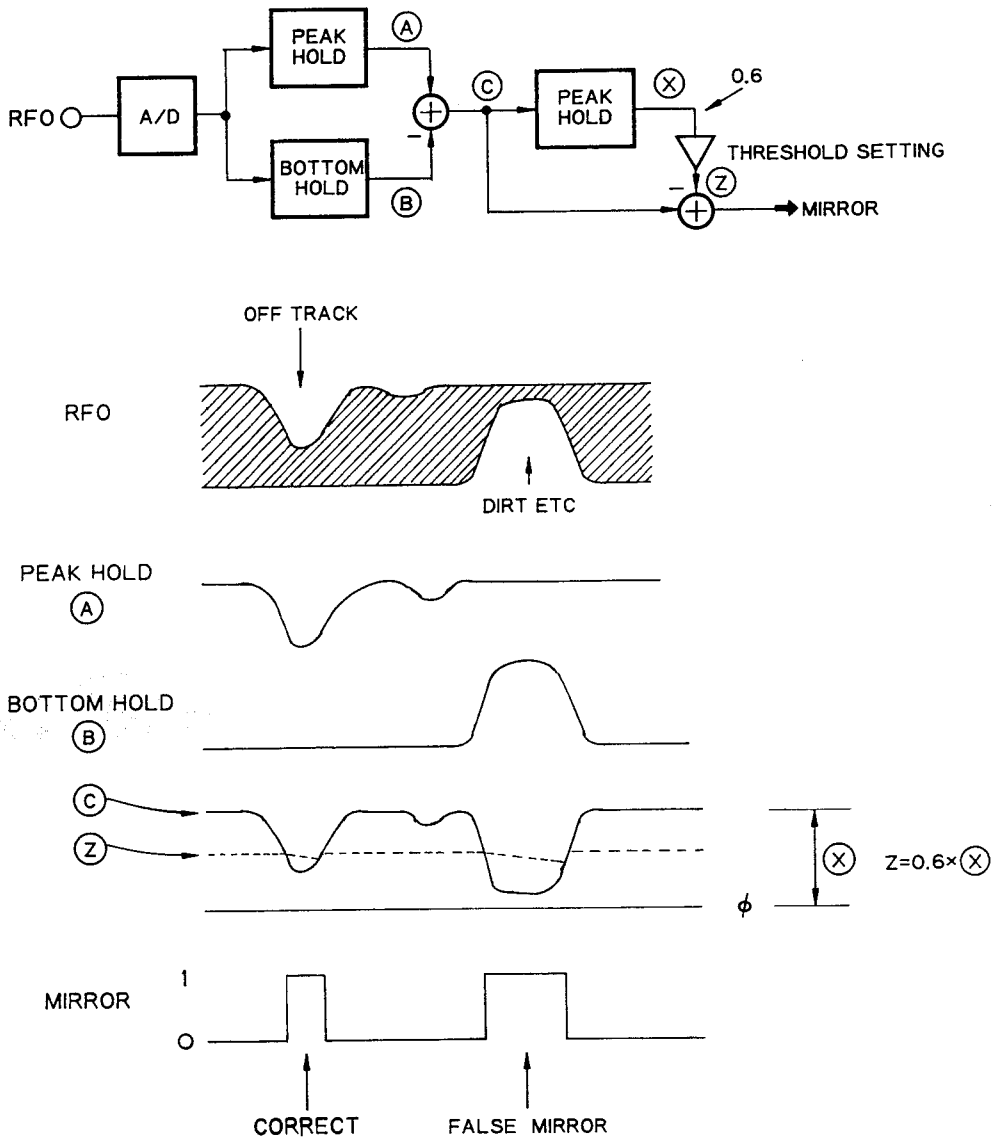


Fig.17 : MIRROR CIRCUIT & SIGNAL DIAGRAM

3) Carriage Servo System

The carriage servo system takes it's input from the low frequency component of the tracking equalizer output. This is amplified and equalized, and the output fed to the carriage motor via the PWM converter, LPF and driver IC. The gain of the equalizer is set so that when the lens is offset from it's center by a set amount the voltage at the carriage motor is enough to overcome friction and move the carriage forward.

Because the carriage motor will only begin moving when the applied voltage is great enough to overcome friction the drive voltage is cut-off inside the servo LSI until it reaches an appropriate level ; thus saving on wasted power dissipation.

Due to eccentricity of the disc etc. the threshold level may be crossed several times before the carriage assembly actually moves. This can result in a series of pulses being applied to the carriage motor.

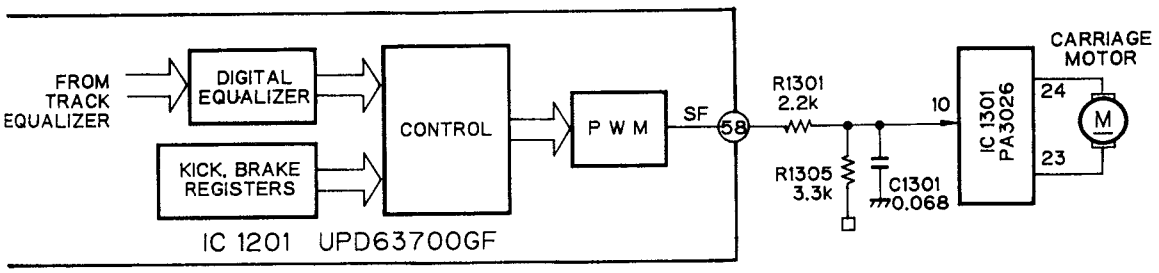


Fig.18 : CARRIAGE SERVO CIRCUIT

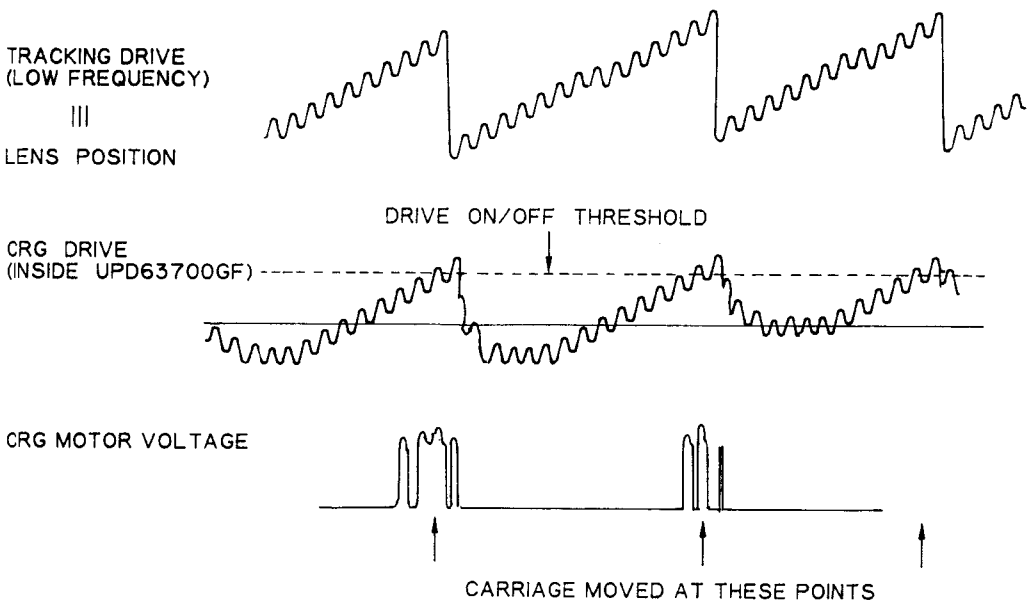


Fig.19 : CARRIAGE WAVEFORM

4) Spindle Servo

The spindle servo has a number of different modes :

(i) Kick : Used at set-up to bring the spindle up to speed from stand-still.

(ii) Offset : This is used i) At set-up, after spindle kick and before AGC has finished.
ii) During play if focus is suddenly disrupted.

(iii) Adaptive Servo : This is the CLV mode which ensures that the linear velocity of the disc as seen by the laser spot is kept constant. During play, a timing signal is extracted from the EFM signal and used to generate speed and phase error signals. These error signals are summed and fed into a servo equalizer to produce a drive signal via the PWM converter.

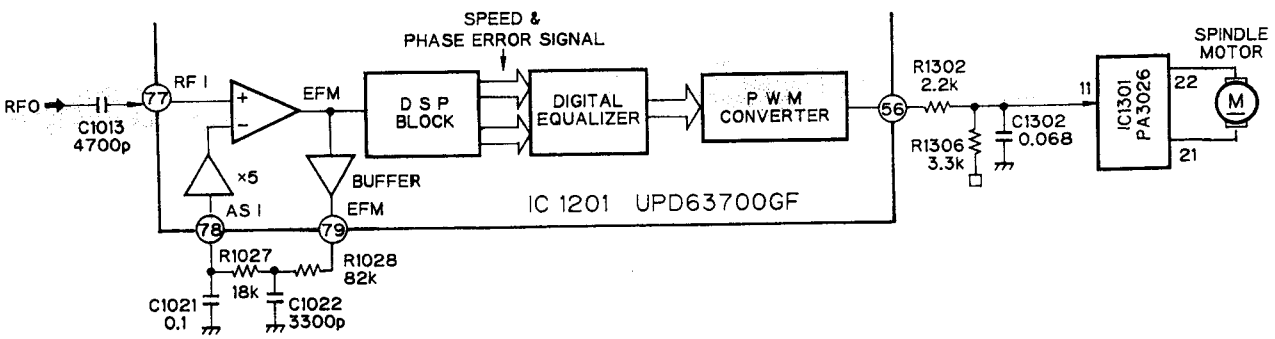
(iv) Brake : This is used to bring the disc to a stop quickly, for ejection or when CD source is de-selected or for any other reason. The servo LSI puts out a brake level and monitors the EFM signal. When the longest pattern in the EFM signal is longer than a fixed amount an internal flag is set. By monitoring this flag the microcomputer can judge when the disc has stopped and proceed to eject etc. If this flag is not set within a certain time limit the servo is switched to STOP mode and eject is implemented after a wait period.

(v) Stop : This occurs at power on or during disc eject. The spindle motor voltage is zero.

(vi) Rough : This is used in normal mode to control the linear velocity of the disc when the carriage is being moved for fast access. A speed signal is deduced from the EFM waveform and input to the spindle equalizer. This mode should be used in TEST MODE to perform the grating adjustment.

a) EFM Comparator

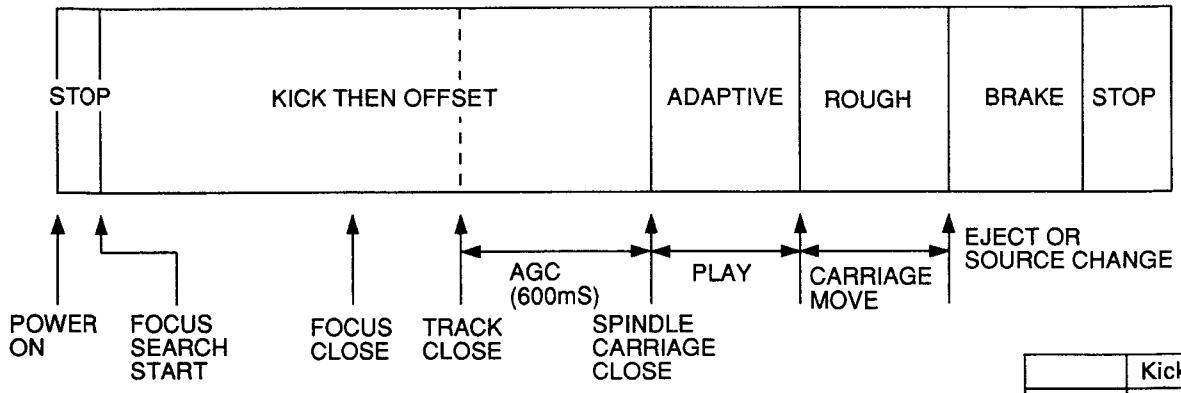
This circuit 'squares' up the analog RF signal into a digital EFM signal. In order to ensure minimum errors it is necessary to use a feedback circuit to match the DC level of the threshold to the center of the RF waveform. This circuit (shown in the spindle servo block diagram) uses the fact that the EFM signal should have no DC component. By feeding back the EFM signal's DC level the threshold level changes until the DC level is zero and the threshold, by definition, is at the exact center of the RFI waveform. The filtering in the feedback has been adjusted to ensure minimum error.



(EFM Compalator Circuit)

Fig.20 : SPINDLE CIRCUIT

• Normal Mode



	Kick Time
12cm	800mS
8cm	300mS

• Test Mode

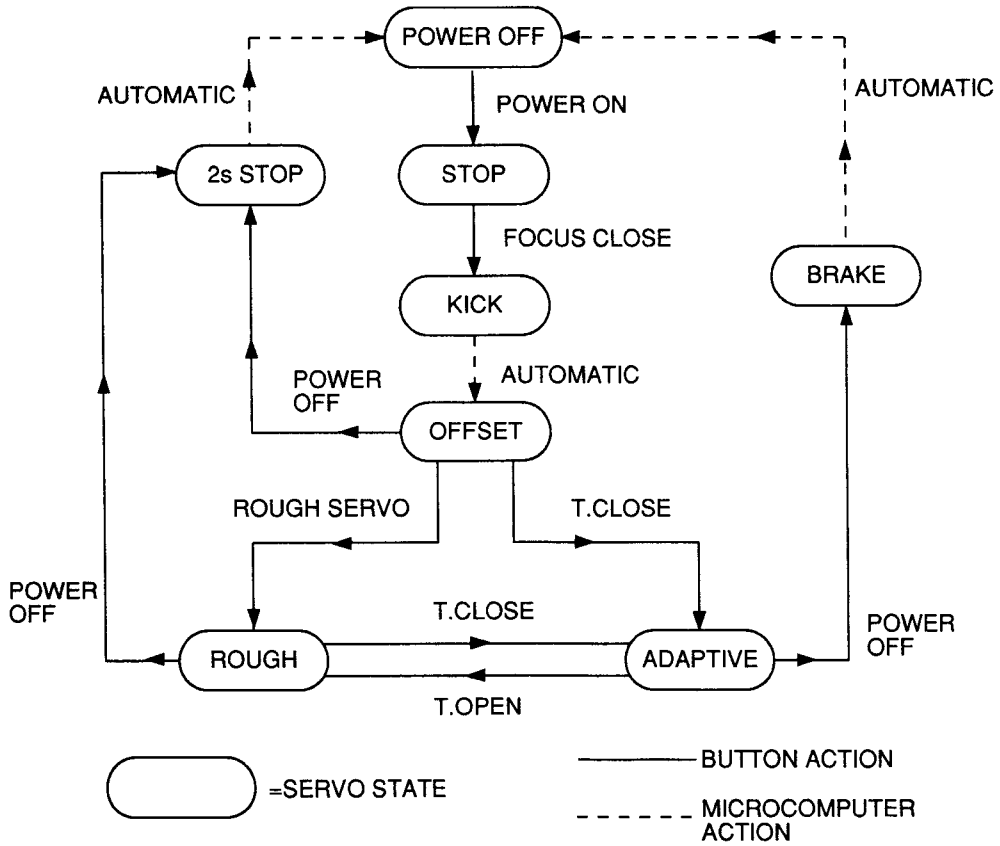


Fig.21 : SPINDLE SERVO MODES

5) Automatic Gain Control (AGC)

The servo LSI UPD63700GF contains a new function which allows the microcomputer to automatically adjust the gain of the focus and tracking servos every time a new disc is inserted or the CD source is selected.
The block diagram of the AGC circuit is shown in figure 22. Basically, a small disturbance signal is inserted into the servo loop at a fixed frequency and the response of the loop is measured via the filtered signals G1 and G2. For a properly adjusted servo loop the amplitudes of G1 and G2 should be equal. The microcomputer reads in these values, does a simply calculation and adjusts the loop gain appropriately.
In order to achieve a high degree of accuracy this adjustment is performed a number of times.
As long as there is power supplied to the microcomputer it remembers the previous adjustment point and uses this as a starting point. Thus, should the system degrade with time (actuator sensitivity, dirt build-up, circuit degradation etc.) the microcomputer can follow this trend and keep the loop gain optimized.
If power to the microcomputer is removed, it forgets the previous adjustment point and assumes a default value.

At shipping the CD player will be within 5dB of this default and no problems should occur. For an older player however this is not so and it is possible that servo closure may not take place immediately. In this case, the microcomputer adjusts the gain 'blind', searching for a stable point.
In TEST MODE, the result of the AGC can be monitored. Once tracking close (with AGC) has been performed the set can be made to display the present value of the gain block. The default value is displayed as '20', which is the value a typical PU unit, PCB & test disc would result in. If for some reason the loop gain had dropped by, say, 6dB (1/2 the typical value) then the gain block will be adjusted during AGC to twice it's default value ; resulting in a gain of '40'. Similarly a set with a loop gain twice the typical will display '10' as the present gain.
Using this, it is possible to 'measure' the loop gain of the servo without the need for any instrumentation. The players shipped from the factory are checked with a test disc so that the value of the gain block after AGC is within the range 11 - 45.

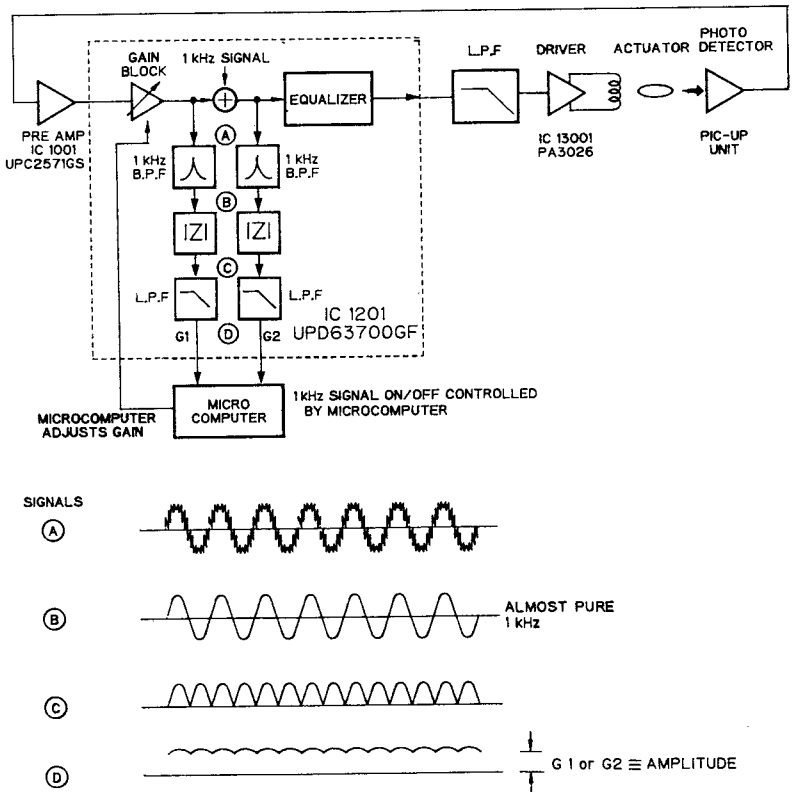


Fig.22 : AGC BLOCK DIAGRAM

6) Power Supply & Loading Motor

Figure 23 shows the block diagram of the power supply and loading motor.

The CD module receives VD (9V) and splits this up into BVD (8.3V), VM (7.6V), and V1 (7.0V) which supply the 4ch servo driver, loading motor and 5V regulator respectively. VD is also used directly by the disc detection LED's. The 4ch driver and laser diode are enabled by the CONT line from the microcomputer. The 5V supply to the servo LSI, pre-amp and audio circuits is enabled by the CD5VON line. The loading motor has no separate enabling input ; the control lines LOAD and EJ serve the same purpose.

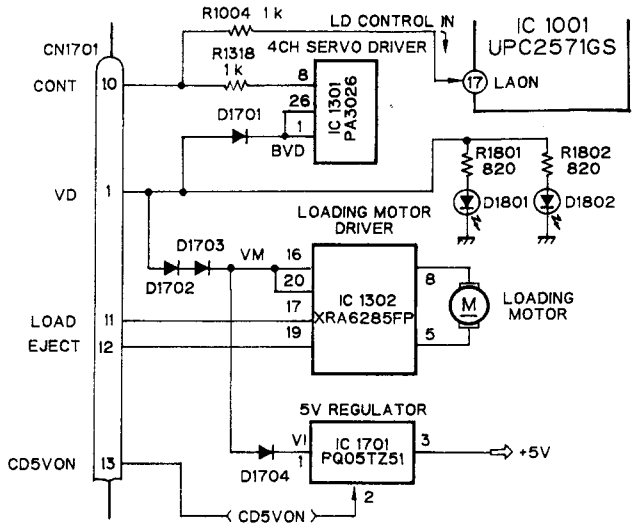


Fig.23 : POWER SUPPLY & LOADING MOTOR

2. MECHANISM DESCRIPTION

● Disc Loading

1.There are two photo transistors in front and behind the rubber roller that convey the disc, and two corresponding LEDs mounted on the unit pcb.
(When the LEDs light, the photo transistor voltage is L.)

2.When the disc is inserted to a point in front of the rubber rollers, a H voltage is recorded on the photo transistor in the front section(P1) and the loading motor starts.

3.The motor drive is transmitted via the gears, the rubber rollers revolve, and the disc is conveyed.
The rubber rollers are held on the tip of the loading arm by the strength of the loading arm spring, and the guide arm is in the raised position.
This gives the guide arm and rubber roller a suitable adhesive strength to push forward the disc which is positioned between them.

4.The clamper arm distinguishes the size of the disc and has a centering mechanism which clamps the disc in the center of the spindle motor.

The centering arm and centering lever are a single unit on top of the clamper arm, which keeps the fulcrum movement centered.

Centering pins and lock arms are attached to the tips of the centering arm.

The centering pins are positioned so that when an 8cm disc is positioned above the spindle motor it's external edge touches the pins. Lock arms revolve around the centering pins. For an 8cm disc it is locked in place by the clamper arms. For a 12cm disc, the lock is released and moves according to the broken line in figure 25.

The position of the detect arm which is mounted on the centering arm at the bottom right of the figure differs for 8cm and 12cm discs. When a disc is positioned above the spindle motor the detect lever, which moves in a clockwise direction on the outside edge, moves to the lower section of the figure.

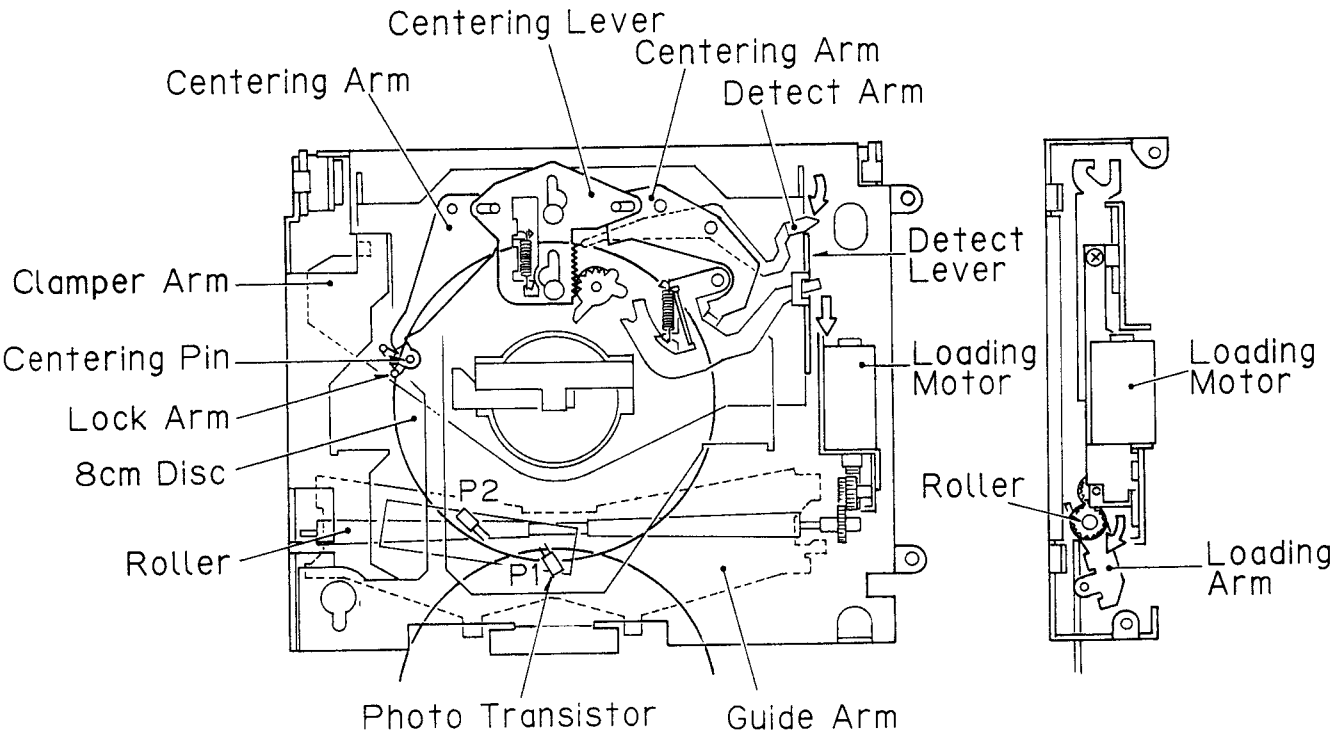

Centering Lever
Centering Arm
Centering Arm
Detect Arm
Detect Lever
Clamper Arm
Centering Pin
Lock Arm
8cm Disc
Roller
P2
P1
Loading Motor
Loading Motor
Roller
Loading Arm
Photo Transistor
Guide Arm

Fig.24

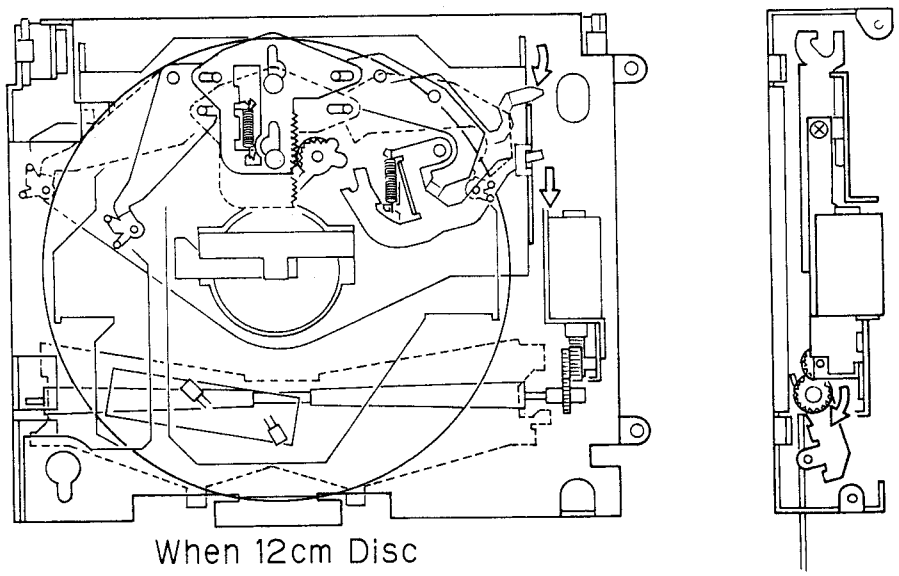

When 12cm Disc

Fig.25

● Clamp Operation

1.The rack gear in contact with the detect lever is engaged with the gear driven by the loading motor, thereby moving the L arm in the arrow direction.
The clamper arm, which had been raised by the L arm, moves down and clamps the disc.

The lock lever which interlocks with the L arm moves the loading arm.
As a result, the rubber roller is pushed down, leaving the disc. At the same time, the guide arm moves down, too. At the position where the lock lever turns the clamp switch on, loading comes to an end.

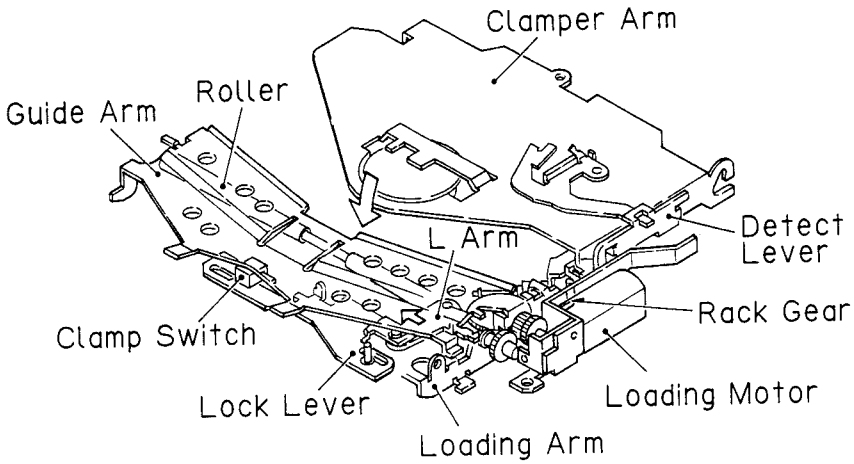


Fig.26

● Mechanism Lock

1.In the eject condition two lock arms are positioned in the frame hole and the front side of the floating section is locked in both vertical and horizontal directions.

The L arm moves the rotating lock lever to the left. The mechanical lock arms L and R move in the directions designated by the arrows and the floating section is released from the frame.

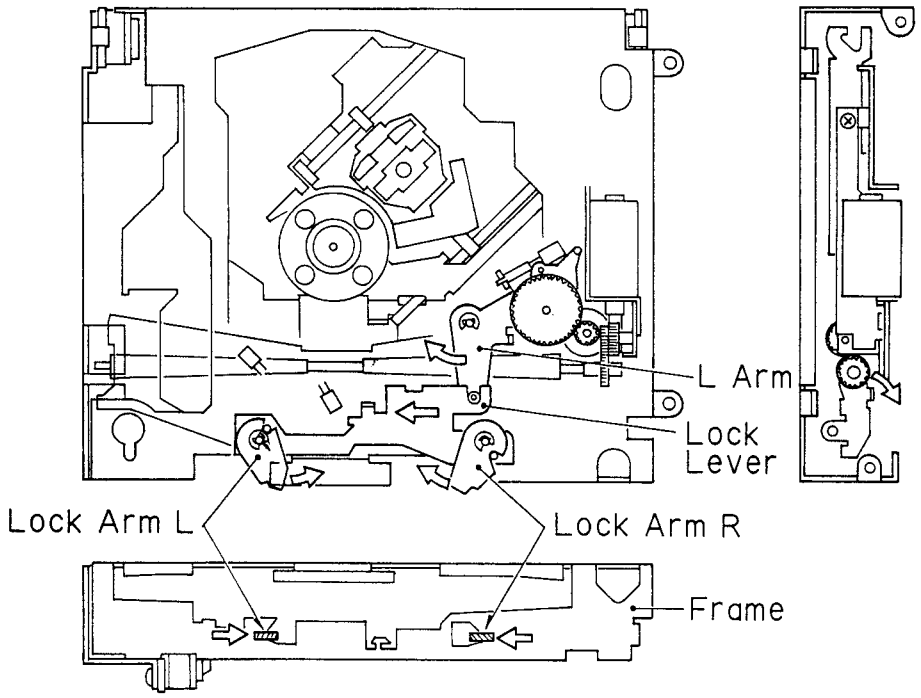


Fig.27

● **Eject**

1.The eject mechanism operates by reversing the rotation which takes place when the loading motor loads. The L arm moves and operates the mechanical lock, the clamp is released, the roller is applied, and the disc is conveyed. In the case of a 12cm disc the loading motor stops at the position at which the photo transistor lights at the rear of the rubber roller section.

However, in the case of an 8cm disc, motor revolution stops after a fixed period of time. In this process the disc type is recognized during play, by the voltage of the photo transistor(P1) located in front of the rubber rollers.

3. DISASSEMBLY

● **How to Remove the Dampers**

(Fig.28)

1. While keeping the CX-540 powered on, insert a disc and put it into play mode (with the arm unit lowered).
2. Power off the CX-540 while in play mode.
3. Unplug the connector and remove the CX-540.

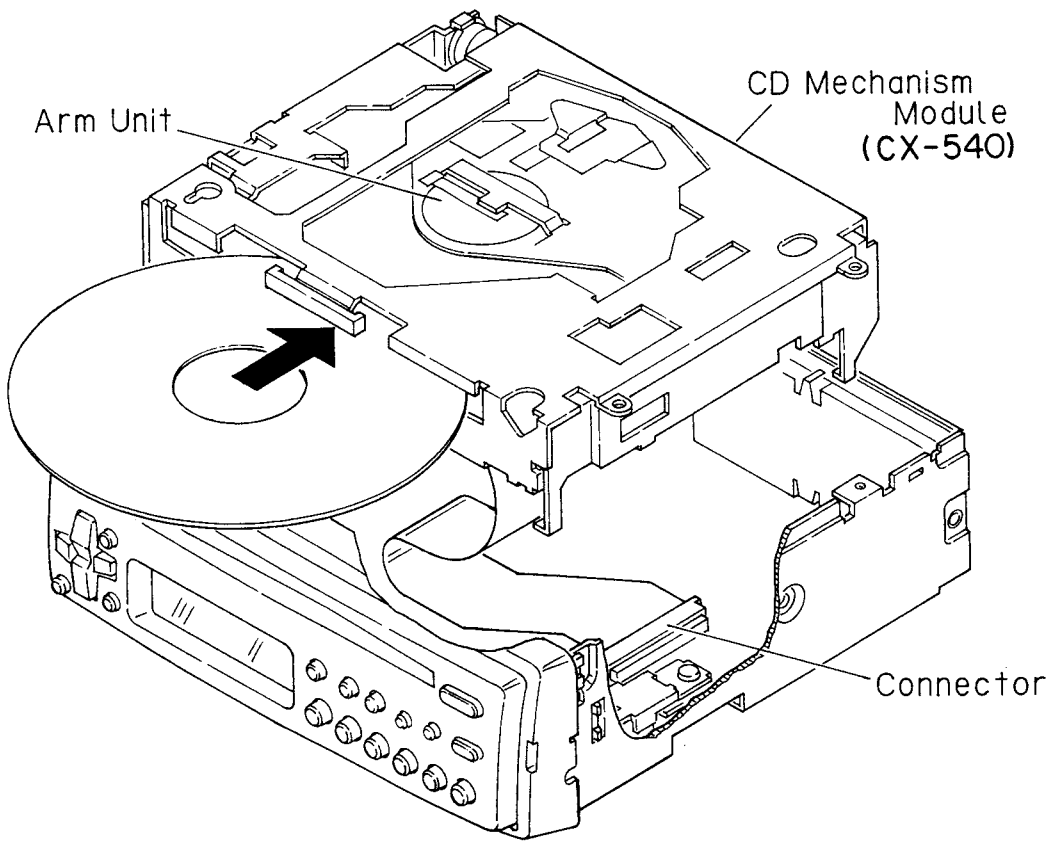


Fig.28

(Fig.29)

4. Unfasten the four screws marked with arrows.
5. Unfasten the two screws A and remove the frame.
6. Unfasten the two screws B and remove both damper and holder at the two locations.

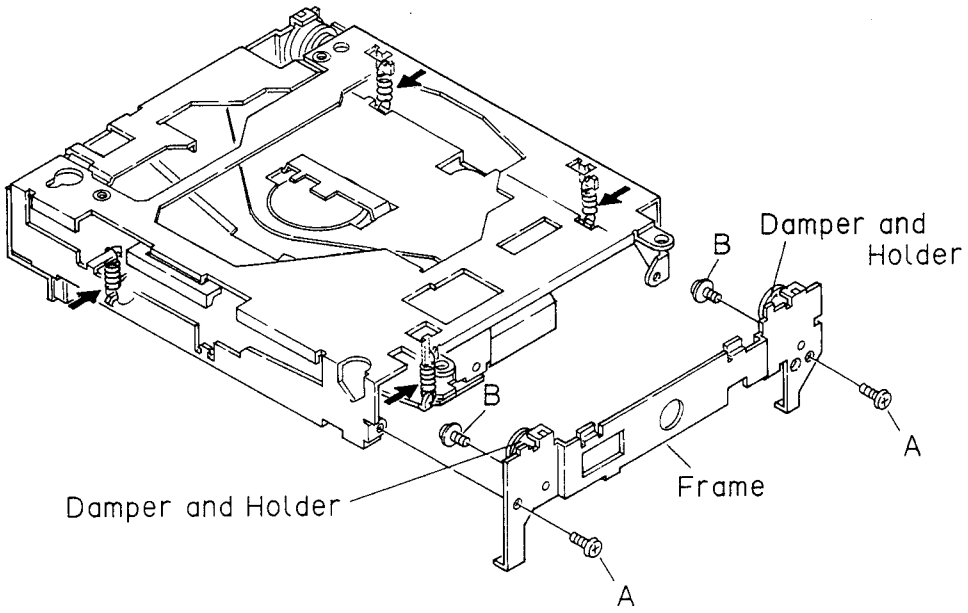


Fig.29

(Fig.30)

7. Remove the frame unit.
8. Unfasten the two screws and remove both damper and holder at the two locations.

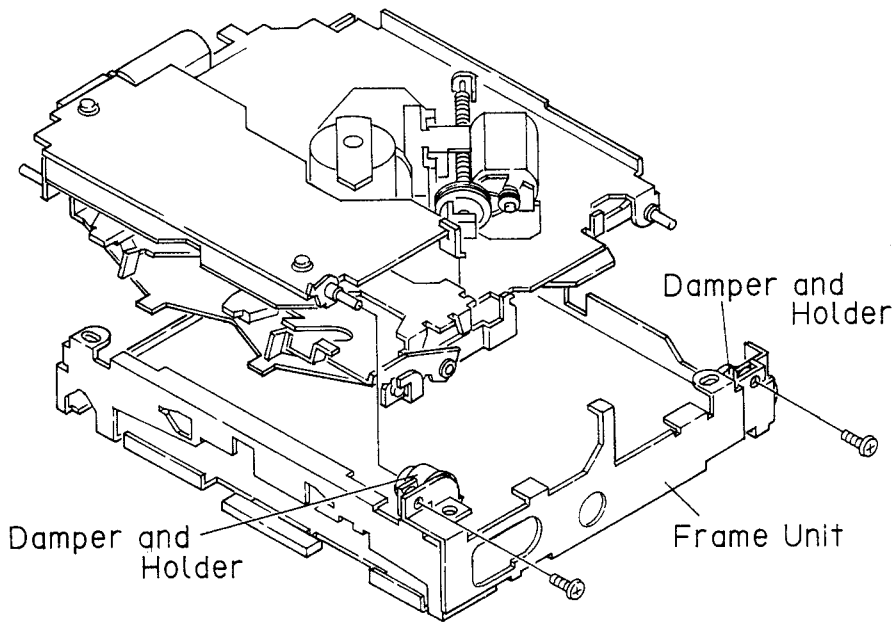


Fig.30

● How to Remove the Spindle Motor

(Fig.31)

1. Remove spring A as marked with an arrow.
2. Remove springs B and C and the arm unit.
3. Remove spring D and the lever.
4. Turn the support wheel so that the screw head becomes visible through the hole.
5. Unfasten the two screws and remove the spindle motor.

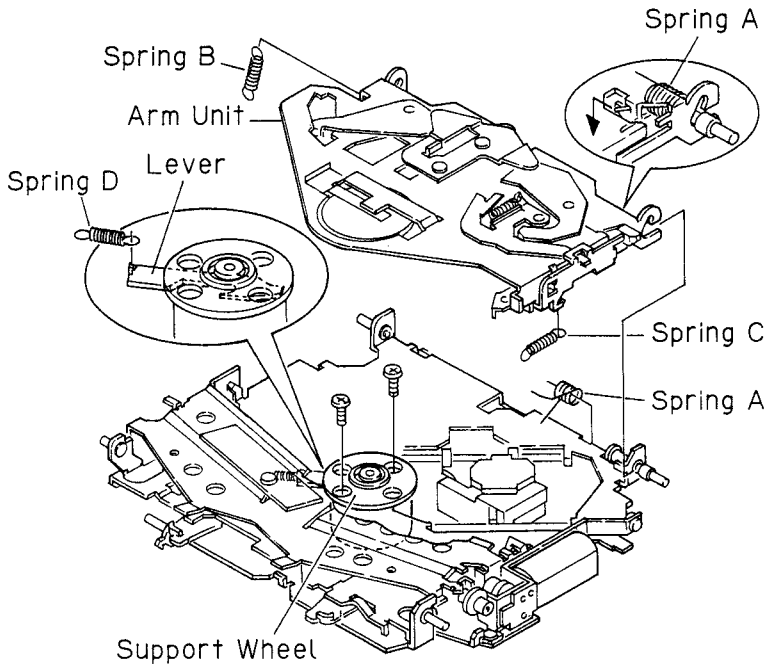


Fig.31

● How to Remove the Loading Motor

(Fig.32)

1. Remove the washer and the arm.
2. Remove the spring.

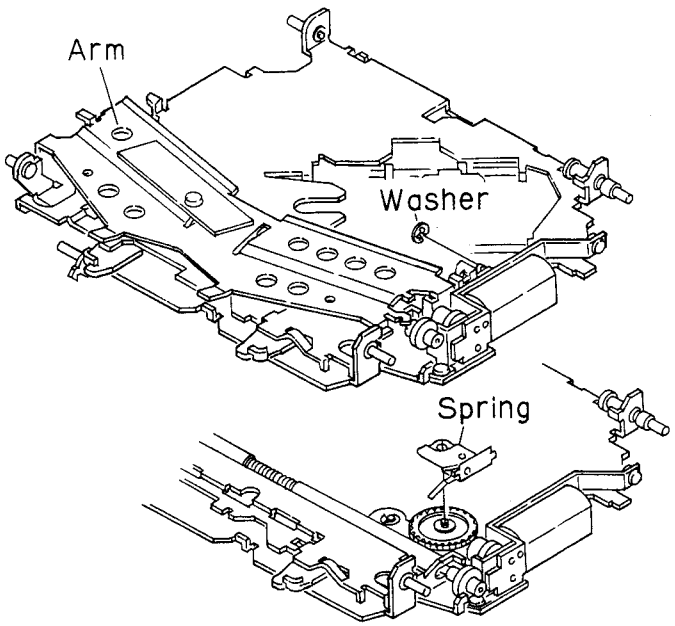


Fig.32

(Fig.33)

3. Unfasten the two screws and remove the bracket unit.

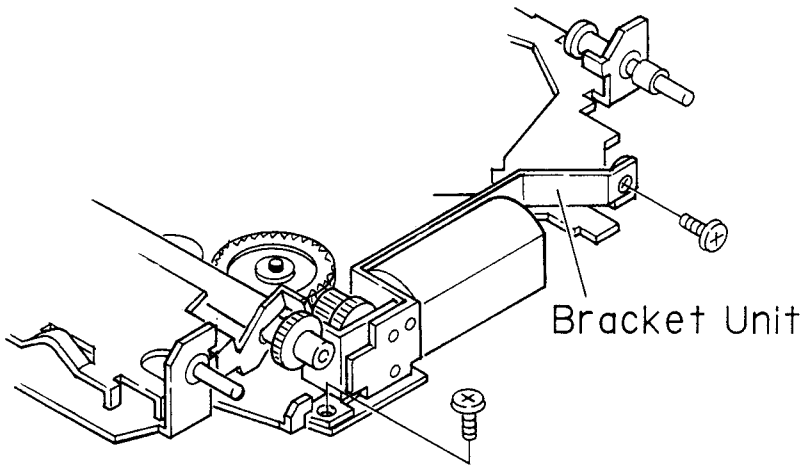


Fig.33

(Fig.34)

4. Unfasten screw C and remove both gear unit and gear.
5. Unfasten the two screws D and remove the loading motor.

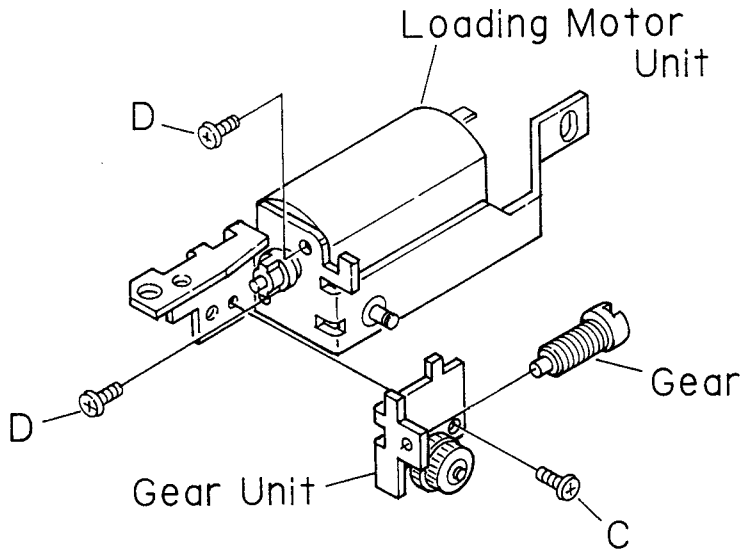


Fig.34

● How to Remove the PU Unit and the Carriage Motor

(Fig.35)

1. Latch spring E as marked with an arrow in the illustration.
2. Attach a short pin to protect the PU unit.
3. Unplug the connector.
4. Unfasten the screw and remove spring F.
5. Remove the PU unit.

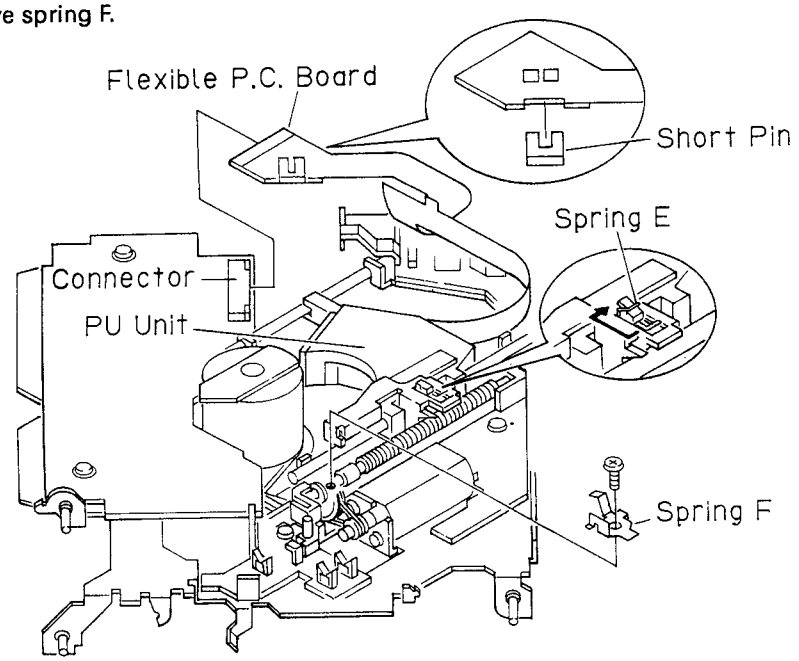


Fig.35

(Fig.36)

6. Unfasten screw E and remove the holder, belt and screw unit.
7. Unfasten the two screws F and remove the carriage motor.

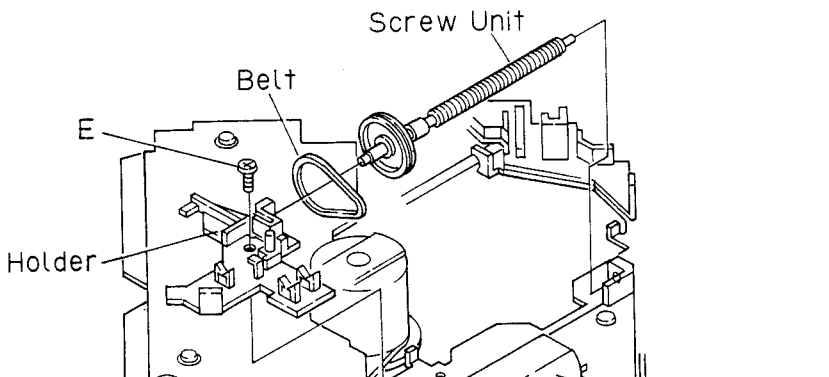


Fig.36